

AUGUST 1953—25 CENTS

# MODEL AIRPLANE NEWS



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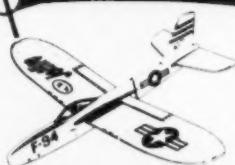
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# MODEL AIRPLANE NEWS

Serving Aviation 24 Years

AUGUST 1953

Vol. XLIX—No. 2

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by  
William  
Winter



► A few weeks from now the 22nd National Model Airplane Championships, the "Nationals" as the oldtimers call it, will get under way at the U. S. Naval Air Stations, Willow Grove, Pa., and Lakehurst, N. J. Lakehurst once was the home port for the Navy's great dirigibles, and it is in the great airship dock-like the one at Santa Ana, in the 1952 Nats—that the indoor events will be held. One may hope that indoors there will begin a comeback. The east harbors a couple of 30-minute men and it may even be that their glider throwing arms are not yet petrified—hi, Bill and Pete. This will be an unusual Nationals for many reasons, but how can you talk about this year's meet when memories of so many others come to mind?

► The '37 Nats in Detroit for one. When funds ran out before the final banquet, the meet management must

have considered hand-launching themselves off the top of the Fort Shelby, at which hotel, in this year of 1953, Plymouth is expected to pick up the tab for all entrants. Someone groaned the story to Roy Howard, the newspaper magnate and, so the rumor went, the banquet was largely the gift of Scripps-Howard. Things were tough all over. One banquet was held in the parking hold of a Detroit river boat. The contestants marched from the hotel to the boat, headed by a skirted bank of bagpipe players. The roar of drums and bagpipes coming up the elevator shaft of the Shelby is said to have been the inspiration for the Dynajet. In those days the boys ran engines in the rooms, made microfilm in the bathtub—one night MAN at Work returned to find a line of indoor men stretched from his room down to a hotel corridor. And wasn't it Detroit where the four a.m.

(Continued on page 5)



PLANE ON THE COVER

One of the greatest fighters of all time is the Vought Corsair which began life before the last war and early this year finally passed out of production when version shown on the cover was delivered to the French Naval Air Arm. So the Corsair is one of few aircraft in existence that could be justly included in both the historical and modern series of Kotula cover paintings. It also is a Marine favorite for ground support and is in active service in Korea. Powerplant is a P & W #2800, 2,400 hp Double Wasp.



NEXT MONTH'S COVER

The well remembered Gee Bee Super Sportster, once the fast racing plane of the mid-30's, features next month's cover. Dubbed Flying Silo, to distinguish it from its less rotund predecessor, the Sportster or Flying Milk Bottle, the Super Sportster once lapped all entrants to win the Thompson, flown by Jimmy Doolittle. Its achievements were many—but it could be a man killer.



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## Man at Work . . . . .

(Continued from page 2)

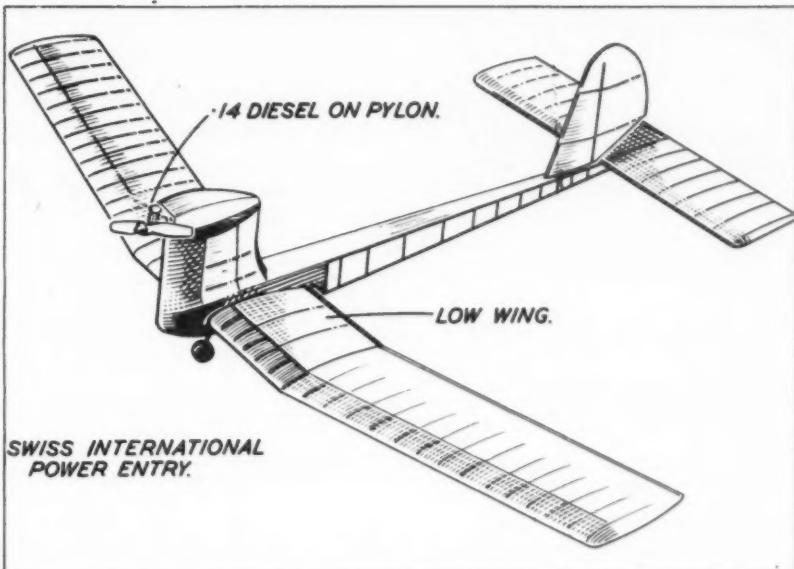
thunderstorm blew down "tent city?" Also where the airplane tug of wars always left the Forster 99 triumphant—it is still around today and would still be triumphant, no doubt. And Chicago, where Jim Walker beat his brains flying a *Fireball*. Everybody said they wouldn't be caught dead with such a model. Free flight was everything and who wanted a model on a string?

Until the Navy and the National Exchange Clubs—Exchange always was the modeler's friend—combined their special facilities and talents at Olathe in 1948, no one ever could be sure there would be a Nationals until the first prop was flipped. All year long between the meets, Russ Nichols used to run himself into the ground trying to line up the now-you-see-it now-you-don't wherewithal. And from past performances, you can bet that Matty Sullivan, this year's director, is working round the clock to help line up things. That's what we like about the Nationals. They are the handiwork of the modelers. Much personal sacrifice has made them possible. Like anything fought hard for, they are appreciated. Nothing can take their place. Any eastern modeler who doesn't compete this year when the greatest of all meets is in his own backyard is missing the chance of a lifetime for the last eastern Nationals was one sponsored by *Model Airplane News* about 20 years ago. Entry blanks and info can be had for the asking from the National Exchange Club, Sylvania Hotel, Headquarters, Broad Street at Locust, Philadelphia 7, Pa. National contestants who would do off-field testing are invited to use the Willow Grove Model Air Base on Rt. 611, three miles south of the Air Station. Courtesy, Glenside Air Scouts and Hatboro Aeromodelers.

Read with fascination the rules for a helicopter event, sponsored by Hiller Helicopters, to be inaugurated at the Nationals. To be held there every year, this event will be put on an international basis like the Wakefield if it meets with the success it deserves. Hiller himself was one of the sharpest modelers ever, made a big reputation in race cars and their manufacturing at an early age, then jumped into the full scale "animated-palm tree" business. Ralph Kummer, associated with Hiller, sent the dope. Ralph's name appeared with regularity among the winners of many big meets during the mid-30's. He was a bona fide expert in rubber, which is all there was, really. The actual rules are too long to permit more than highlighting here. Complete rules may be obtained from Ralph W. Kummer, Hiller Helicopters, Palo Alto, Calif.

Nationals entrants will find Hiller's rules cover three classes: rubber, jet, and internal combustion. Brother, this is no toy pin-wheel event. The whirlbirds will be judged for their ability to go places besides up—going up not being an exactly insurmountable problem. Points are awarded according to the degree of excellence with which ship performs vertical flight, forward flight, duration, and special maneuvers—like backwards or sideways flight. A sliding scale compensates for variations in types of powerplants. Just to give an idea of the competence of the rules: "Vertical flight is to be judged as follows: retention of heading, 10 points; stability in flight, 20 points or proportion thereof; lack of self induced drift, 10 points;

(Continued on page 8)



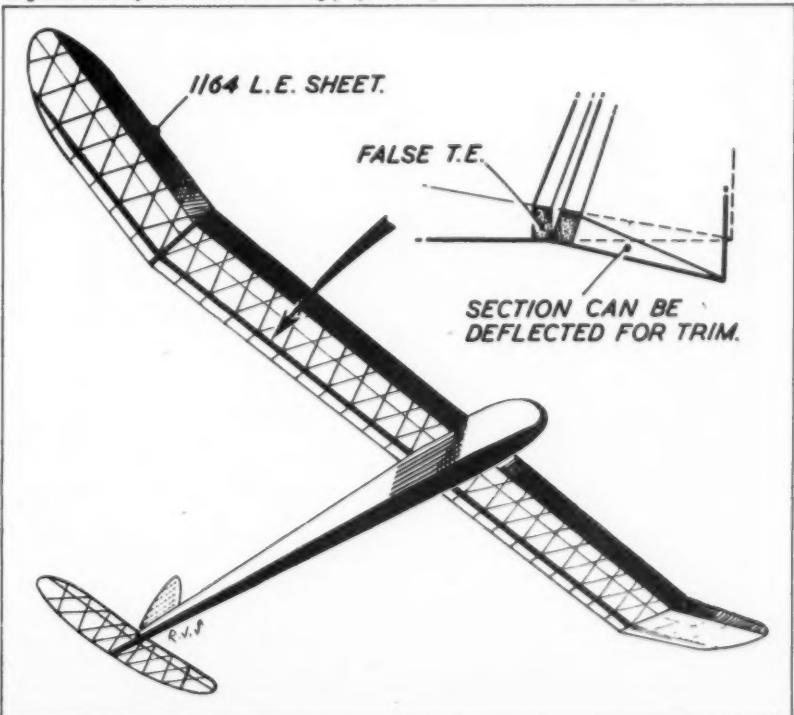
For years Swiss free flight models have been characterized by shoulder wings, high thrust lines. This interesting Swiss elimination for the Cranfield finals will startle States designers.

## SOMETHING NEW TO TRY—TWO NEW EUROPEAN IDEAS

When Pete Wyatt, British free flighter, broke the bearers on his 1952 FAI job, he put the bearers on top of the pylon, stuck the wing under the fuselage. It worked so well that the idea since was seriously copied. Yeabsley's towliner, below, has

false spar at 75 percent chord. First flown with neutral flap, flap is progressively dropped until finest glide angle with minimum sink is obtained. Best results are obtained with 3/32" down flap. Idea has possibilities.

One of the first uses of wing flaps on a towliner is this A/2, or Nordic type, by Roy Yeabsley, England. The flaps are used for trimming purposes only. Idea traces back to Borge Hansen, Denmark.





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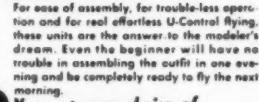
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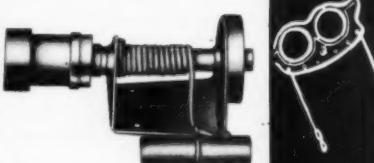
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### Man at Work

(Continued from page 5)

good landing, 10 points. Stability and lack of oscillating tendencies should be emphasized. Maximum vertical flight points: 50." There's four pages of this stuff—so get a copy.

Speaking of helicopters, Jim "Ceiling" Walker, has been considering a duration event to be held for *Ceiling Walkers* throughout the day of a regular contest, so that modelers can try the vertical flight event whenever the mood strikes them. A *Ceiling Walker* would be given each contestant. The contest official would hand out special rubber, lubricant, and winder, if ultra performance was desired. Jim would put up these ingredients, too. Also a prize.

When members of the Model Industry Association met in New York during the Toy Fair earlier this year, one problem discussed was the prize situation. Anyone running a contest writes the manufacturers who seemed to favor setting up some central authority to which they could refer requests. To this authority, the manufacturers would contribute. Somehow MAN at Work feels the contest managements will favor the old system—should the new-fangled idea be tried. It's much tougher to say no. So along comes Jim Walker (he gets into everything) who is "...firmly convinced that each model airplane manufacturer should be more interested in contests even to the extent of assuming all sponsoring expenses of one or two meets a year. This doting of his own child may be too much to expect but it is high time someone start the ball rolling in this direction." So while we crouch in the slit trench waiting for the dust to settle, note a release from R. H. Elliott, Atlanta, crediting Jim for giving \$50 U. S. Saving Bonds to 32 event winners and putting up a Perpetual Trophy to match the Arthur Godfrey Perpetual. As we went to press Atlanta was expecting a model building invasion.

To our crack that "What this country needs is a good sport model," Harry Moyer, Lebanon, Pa., responded with a picture of a largish RC job with MacNabb receiver. Wings come in half, nose comes off, etc., for easy traveling. In a two-month period, Moyer made 1520 flights without a hitch...To Max Roberson, Ashland, Oregon, and all the other guys who want Jap tissue, we don't know where. Eastern rubber men are trying to get some manufacturer to import the stuff. It's really needed for Half-A gas as well as rubber...From *Flypaper*, Bucks County, Pa., model paper: "Swap: McCoy 49 in excellent condition—it was used only by an elderly couple for going to church..." Glo-Bugs, Vancouver, WN, say we located 'em 300 miles too far north. This is Vancouver, Washington, so Vancouver, B.C. "blokes" can stop looking for that non-existing club!...DC/RC Club, Washington, D.C. has over 50 RC members, most on tone using Good's three-tube design... Flying Fools, P.O. Box 1302, Woonsocket, R.I. Pretty active; local fans take note...Movie, making of jet aircraft blades, Henry Zellweger, Utica Drop Forge and Tool Corp., Utica 4, N. Y.

Highlights of Farnborough, 1952, a 26-minute film of spectacular air-to-air shots of British fighters breaking the sound barrier—Public Relations, Shell Oil Co., 50 W. 50th St., N. Y. or 100 Bush St., San Francisco, Calif.

END

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e!



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The compass mechanism in this installation, located above the wing tongue. Pointing to the compass is the author. Such gliders must be large.

► Away up in the Swiss Alps, before the snows settle on the steep grass valley slopes, you'll find a group of heavy booted Swiss modellers and a collection of huge gliders. Now that might not sound so very extraordinary, but closer study of the models, each around 12-foot span, reveals a difference or two that invites further comment. Talk to the modellers and another strange fact comes to light. These jobs are designed to fly STRAIGHT!

They are competing for the annual Compass Steering contest, an event where the object is for the model to fly across the valley, lose maybe up to 1,000 ft. of altitude, and land right on the button about three-quarters of a mile away. A point-to-point contest where the entire flight can be watched in comfort and there's little fear of a fly-away. Just give the heave-ho and sit back on a rock sweating it out for three to four minutes while the job weaves through the cross currents in the valley until terra firma suddenly arrests its progress and wings, tail and fuselage flutter apart in your binoculars. Easy? Not a bit of it!

This is one of the most skilled gliding events known, and it can only be made possible by photo-electric cell, radio control, or compass steering. Ask anyone who has tried slope soaring how to keep from turning back into the hill. It's quite a problem, and can be frustrating after the 20th launch!! But, with steering control, things become easier—with complications.

Rule out photo-electrics; the sun can never be relied upon in Central Europe! Rule out radio, as that makes it possible for easy corrections during flight, and we are left with the ingenious compass unit, first evolved by a clever electrical engineer in Zurich.

In the fuselage we have a set of high amp 4.5 volt batteries or accumulators, a solenoid actuator to trip the rudder, and the all important compass, which is little more than a switch gear. Built onto a fibre insulating disc is a light alloy frame carrying adjustable pivot points for a tapered compass needle, one end of which is always attracted to magnetic north. Off this arm is a small extension passing between a couple of foil contacts so that, as the compass arm swings to right or left in relation to the base, it will pass the battery current to one or other of the actuator solenoids.

Supposing we have to fly due East. Then we swing the compass base around over the protractor so that the fuselage is pointing East and the North side of the arm is heading

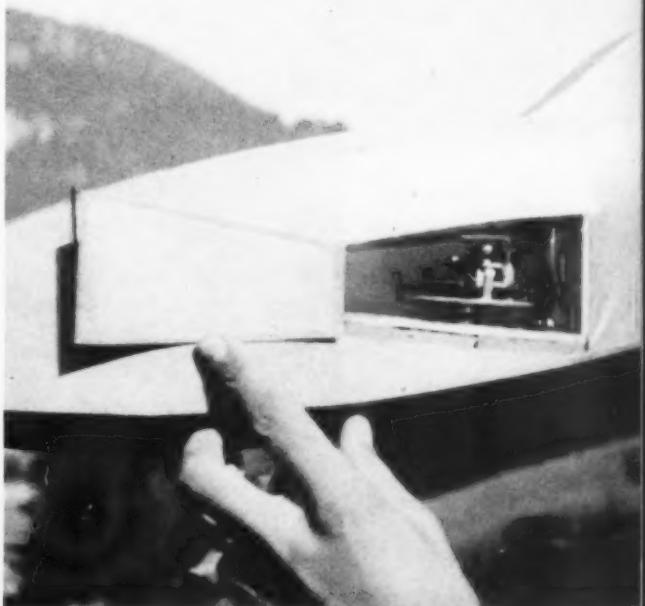
# Compass Steering

by RON MOULTON

*High in the Alps is held the world's most unusual contest, for big gliders that cross valleys to their objective. You could hardly do better with a radio.*

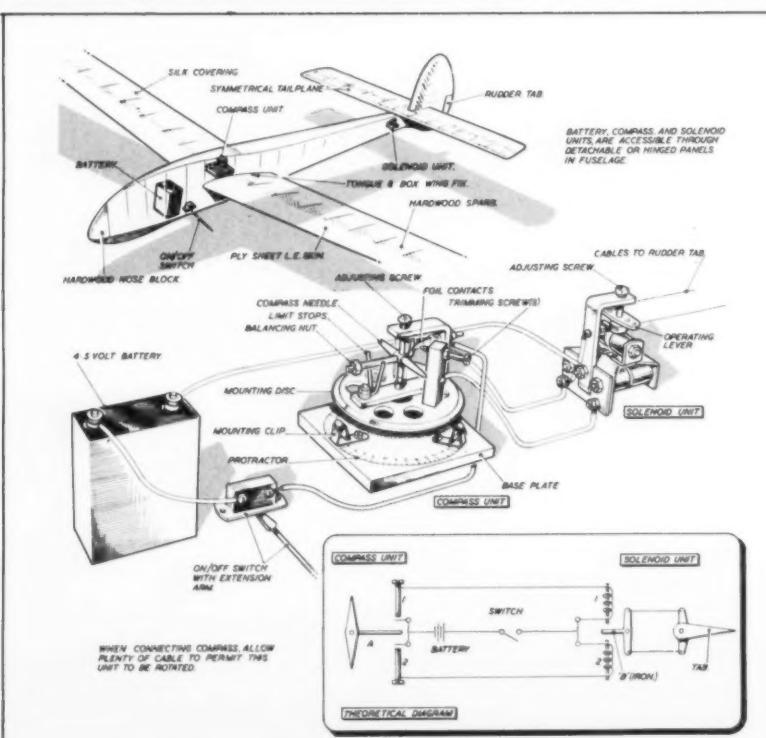
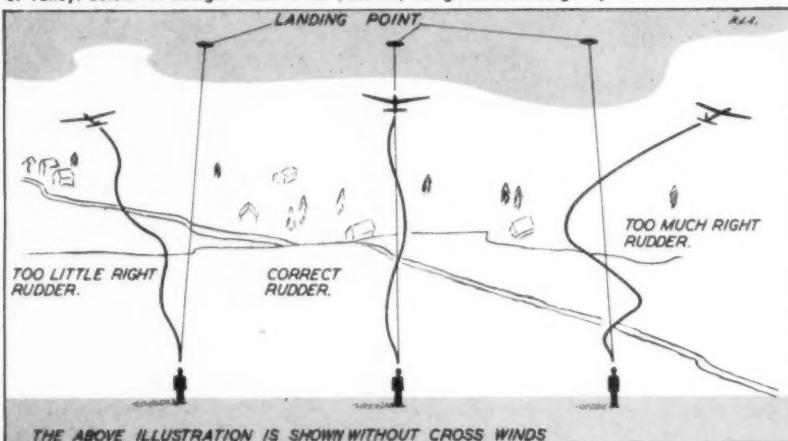


Typical entries at the 1952 Swiss National Contest for compass steering, held at Saanen. Gliders maintain a heading to objective across valley. Below—The compass installation in this model is forward of the center of gravity. Door gives ready access for necessary trimming adjustments.





On its way across the valley, a straight slope soarer is sent out to find wind directions in center of valley. Below—A straight flight is not possible; the glider weaves gently with corrective rudder.



magnetic North. Now, as long as the job glides due East, the compass arm floats midway between those electrical foil contacts. But if it veers right or left, then over bangs the rudder as the arm closes the contacts. Rudder correction swings the model back due East, and we start all over again. Usual flight pattern is a series of meandering curves to either side of the straight line between launching site and target point. That's how it works. The skill of operation takes over from there.

Imagine the valley. Far below are chalet rooftops, an hour's clamber to your launching site which is well below the mountain top to avoid turbulent downdraughts. Those roofs are perhaps 2,000 ft. below, and over on the opposite valley slope, there's a clearly marked landing point. An ordinary slope soarer is sent off to check wind currents. It forges out away from the hillside, drifts fast to the right, then to the left, and after a couple of minutes, settles back on our side of the valley, but quite a long way down. In other words the first wind direction is from our left, further out, the wind is not so strong and that slope soarer's left rudder gained a hold. But out there in the middle, the air currents are milling around like the waters at the foot of Niagara.

And our compass job has to weave a way through all this!

This is where a touch of skill comes in handy. If between the launch and touchdown, the large glider is to penetrate right through winds of any direction, then not only has the steering got to be perfect, but the design must also have specialities. Say for instance that we know there's more wind from the left than from the right, or that we are flying in an endless valley where wind-flow is in one direction only. The compass now has to be set for what is known as "Bias" more right than left, or vice versa. On the compass unit, each contact point has an adjustable trimming screw. It is even possible to arrange for no contact at all on one side if required, but there would be little need for such a setting. All that has to be done to fix more right bias than left, is for the contact trimming screw to be undone more turns on the *left* side so that the left rudder cannot "come-in" until the glider is well over on a right turn.

Alternatively, there are separate holes on the solenoid actuator arm, just like the controlliners have on bellcranks and elevator horns, so that the hook-up can be fixed for (Continued on page 47)

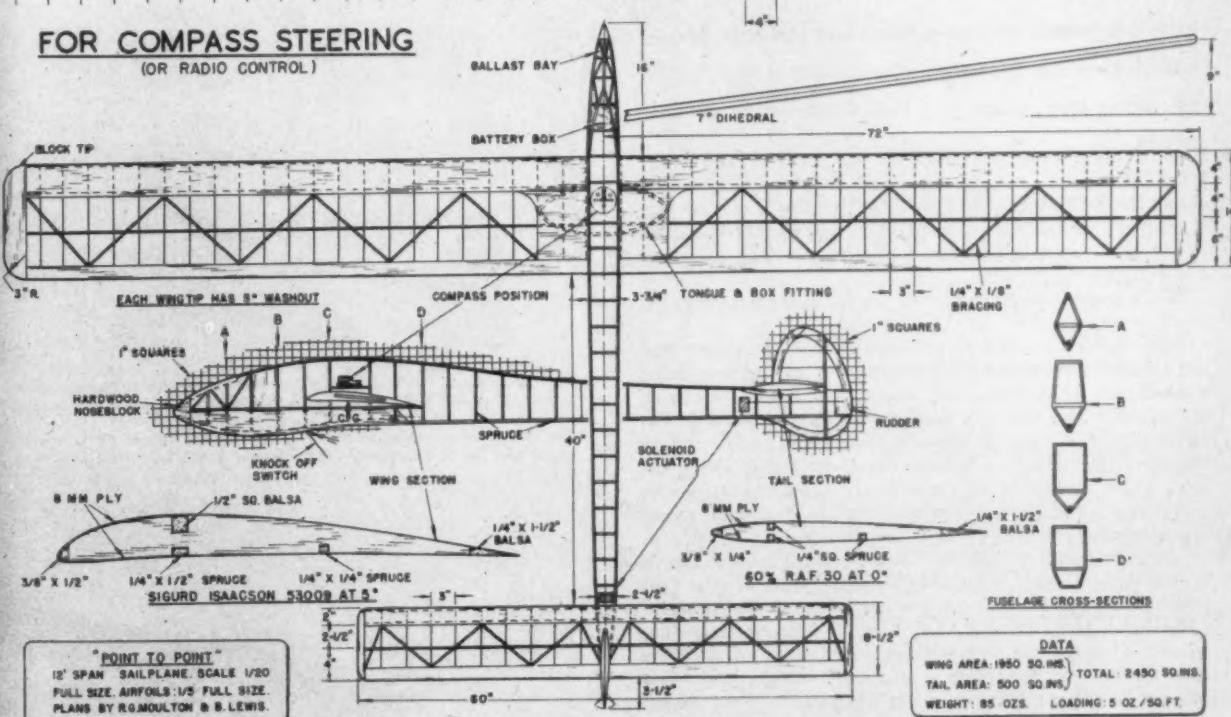
**How it works:** compass unit swung over protractor base so that, when fuselage is pointed in desired direction, needle is attracted north and projection A is free between foil contacts. If off course, needle swing is relative to model closing contact with trim screw 1 or 2. Field set-up by solenoid 1 or 2 attracts swinging coil B, attached to horn, operating rudder.



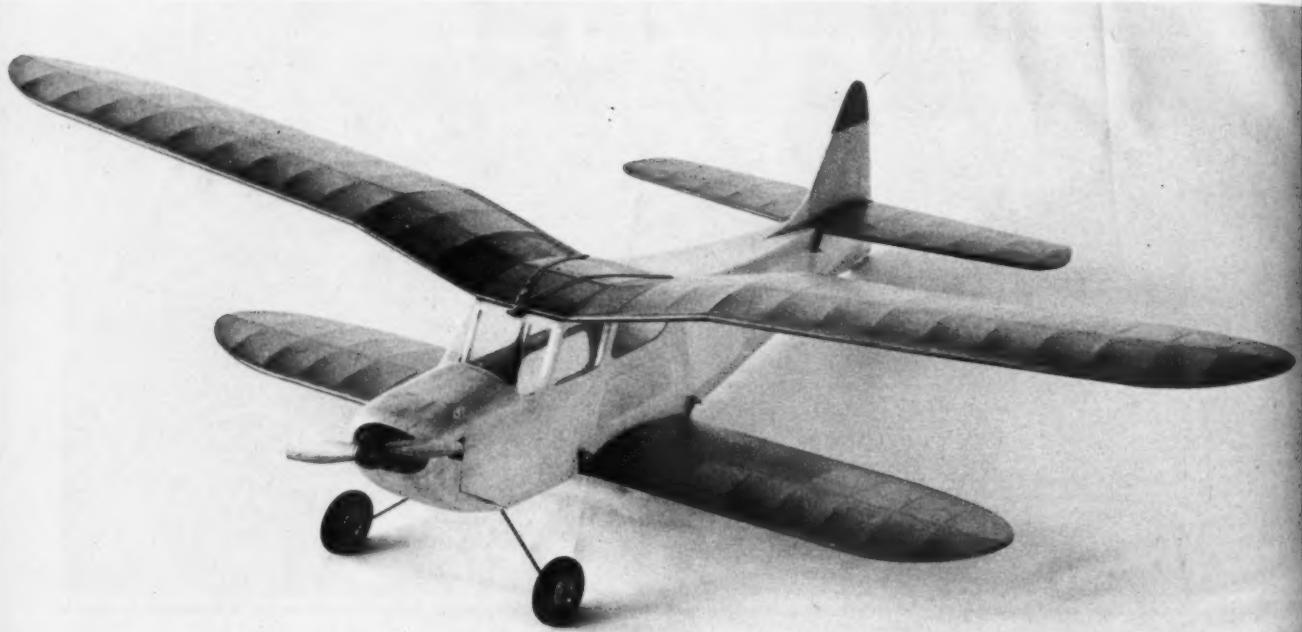
Traugot Haslach lines up fuselage with the target using camera tripod. Note hefty mountaineering boots for clambering over mountain slopes.

Below—The plans of this typical 12-foot compass steerer will be of interest to any radio control hobbyists looking for a really big proven glider.

## FOR COMPASS STEERING (OR RADIO CONTROL)



# Duranita. ■ ■ by KEITH STOREY AND KEN WILLARD



Cabin sides are of sheet, cut out for lightness. Both wings, stab are held on with rubber. You can fly the Duranita left, right, with rudder.

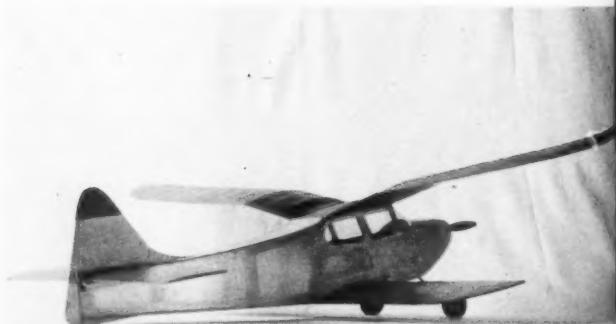
**There's a world of know-how behind this beautiful gull-wing biplane. It's a sport free flight job especially sized for the Duro-Glow diesel.**

► For sometime now British engine makers, with their Mills, Frogs, Darts, etc., have pretty much dominated the diesel engine field. But when we found out that the Duro-Glo was coming on famously in its experimental tests and would be put on the market, we became interested in trying to design a ship for it.

We wanted something proved and reliable, yet presented in a new way.

After hashing over all the possibilities, we had an idea; why not redesign a little gull wing biplane that we had previously worked out, which was a real center of attraction whenever flown, and which had very good flight characteristics! It was called the *Santa Anita* so, when we redesigned it and installed the Duro-Glo diesel, it became the *Duranita*. It also grew from a 27" span to a 42" span in the process, because the power which the Duro-Glo puts out is one of its most amazing features.

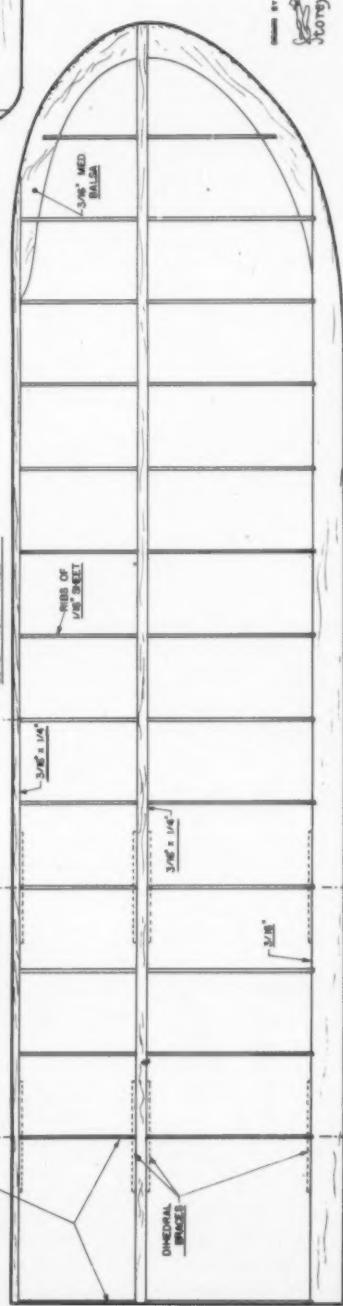
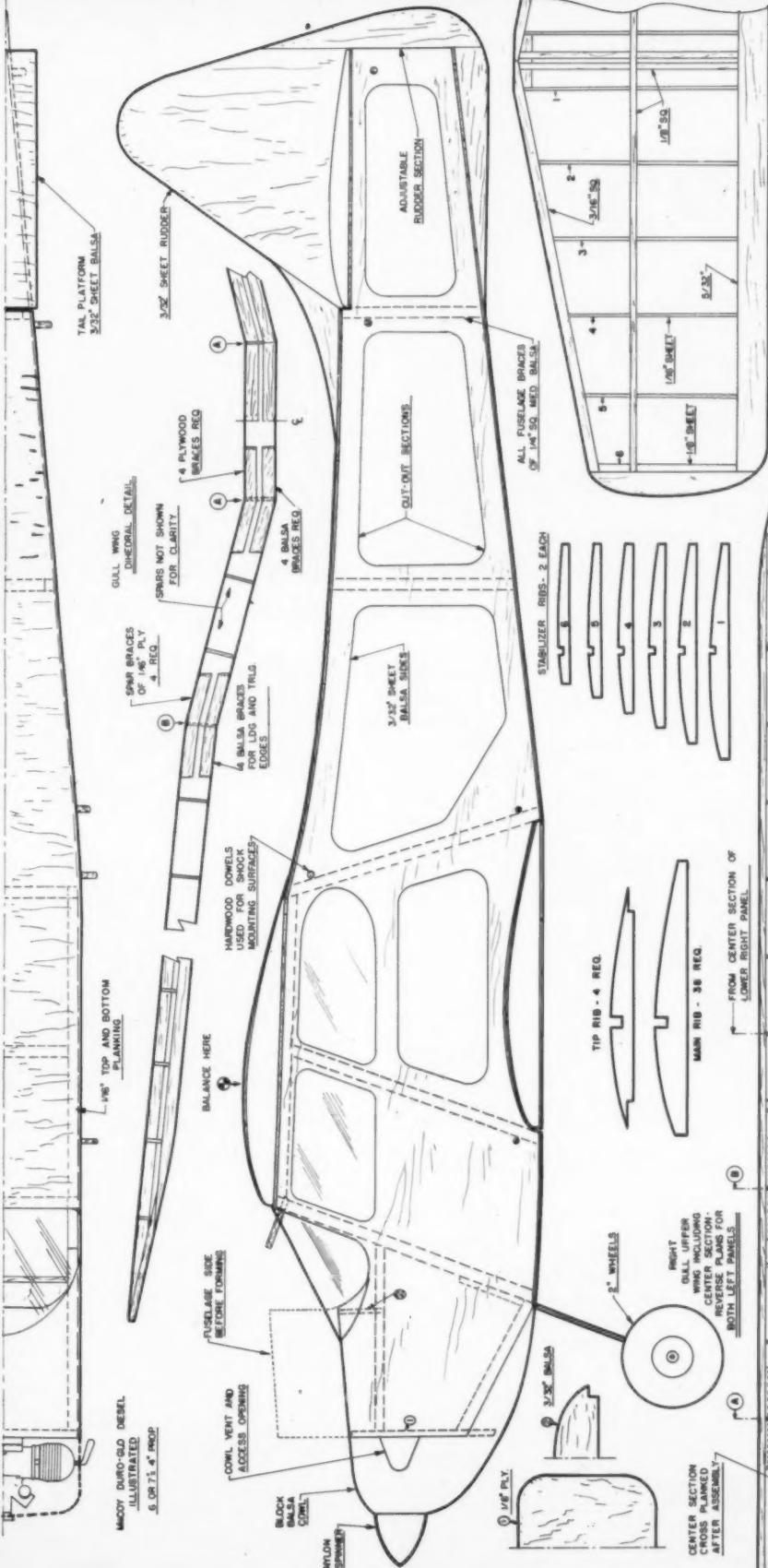
The first test flight of the *Duranita* confirmed our faith in the design; with engine regulated to turn over at low power, the airplane took the air from a hand launch, made a beautiful, large climbing left turn, circled overhead and, when the limited fuel tank was empty, the plane just dropped nose slightly and went into a practically straight glide. We grinned from ear to ear, went over and picked up the model, refueled and, without touching adjustment, started up the engine and gave it full power. Whoosh! The same flight pattern was there, but model flew (Continued on page 37)



The gull wing is assembled from five panels: two outer panels, center section, and two gull panels. Joiners used as with any dihedral joint.

The side-mounted engine makes for a clean, neatly cowled nose. Butyrate dope, like Sta or Aerogloss, will withstand both diesel and glow fuels.





## FULL SIZE PLANS

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See Page 52

*All kinds of ships take to the air. Now that summer is here, it's time for real flying.*

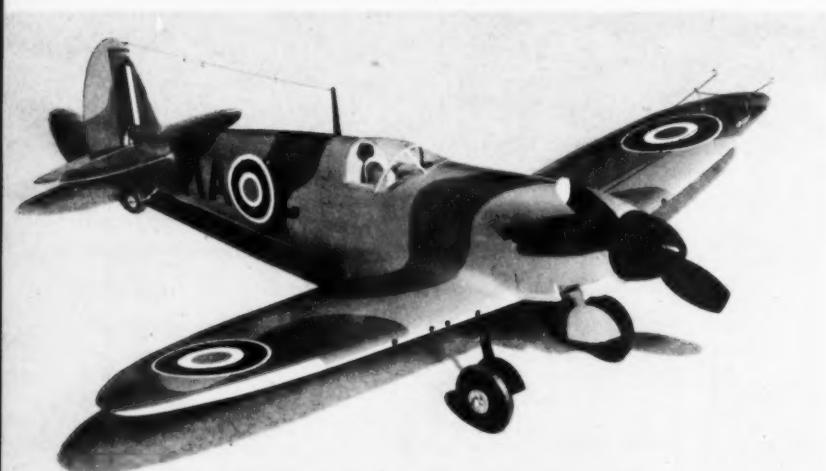
AIR



Fran Uyematsu, Montebello, Calif., Nationals PAA Load winner, likes payload flying but he also sticks to his pylon designs. The result is this interesting dummy located under the pylon.



Russian LAV 17 jet being launched by Bob Linn, Los Angeles, is powered by a K & B .049 and ducted



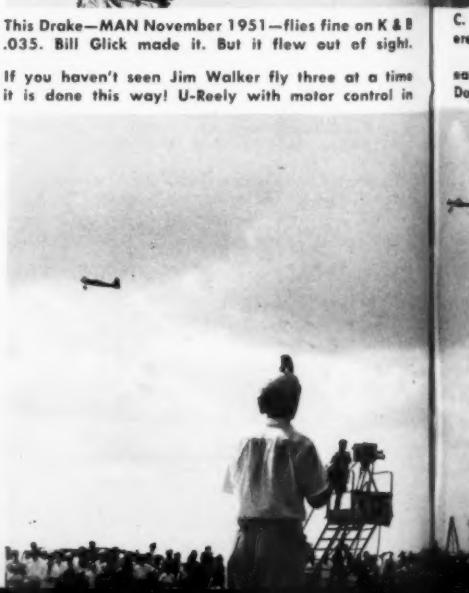
When L. V. MacDonald, Ottawa, Ontario, built this Spitfire he made it an exact duplicate of the "kite" he piloted during the war. Hurricane .24 for power. A big trend to ukie thereabouts, he says.

Below—Fully stuntable Great Lakes trainer with Frog .29 engine is also the handiwork of L. V. MacDonald. It's a scale reproduction of the air cooled version of the famous plane of the thirties.



This Drake—MAN November 1951—flies fine on K & B .035. Bill Glick made it. But it flew out of sight.

If you haven't seen Jim Walker fly three at a time it is done this way! U-Reely with motor control in



R

# WAYS



fan. It weighs 11-1/2, was built from British kit. The first such job in the area, it is not fast, but steady.



C. A. Stapler, of the U. S., test flying Mills 75-powered glider at the 1952 Fairlop contest, England.

each hand. Lines for third ship from pylon on helmet. Doesn't he hold the third motor control in teeth?



Yellow-and-black, DH Gypsy Moth and one of the trophies won for its builder, 1/Lt. Edward Heyn, Fort Knox, Ky. Has every detail—and it's no wonder; Heyn owned and piloted the original.



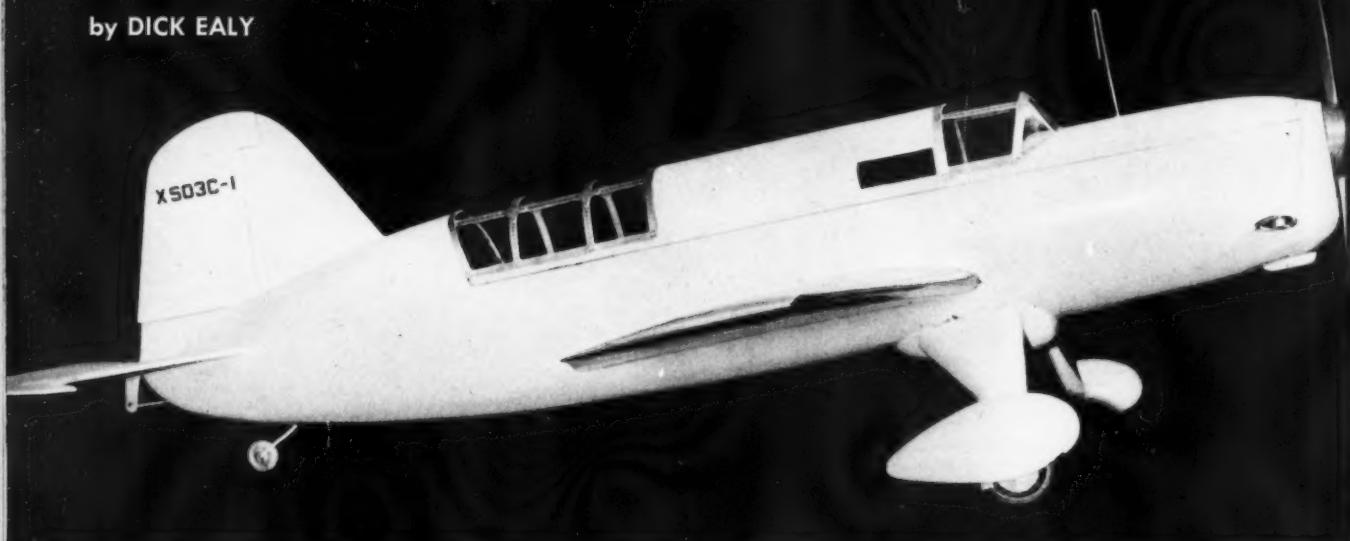
Really terrific idea, is this Berkeley Bootstraps, fitted with floats and controlled by radio. Don Atmur, Abingdon, Md. is builder. Power is side mounted Cub. Waterproofing radio is problem.

Below—Still another beautiful scale job by W. R. Linke, Seattle. Span of this Lockheed is 40 in., power Fox .35. Hot performer, and as pretty as its namesake. Half-A model in Dec. 1952 issue.



# CURTISS SEAGULL

by DICK EALY



Big ship features lend themselves beautifully to the model. The long nose helps the balance, the in-line engine simplifies cowl, fuselage top removes.

Especially designed for the Navy's Carrier Event, and for scale flying, this SO3C-1 does a real job.



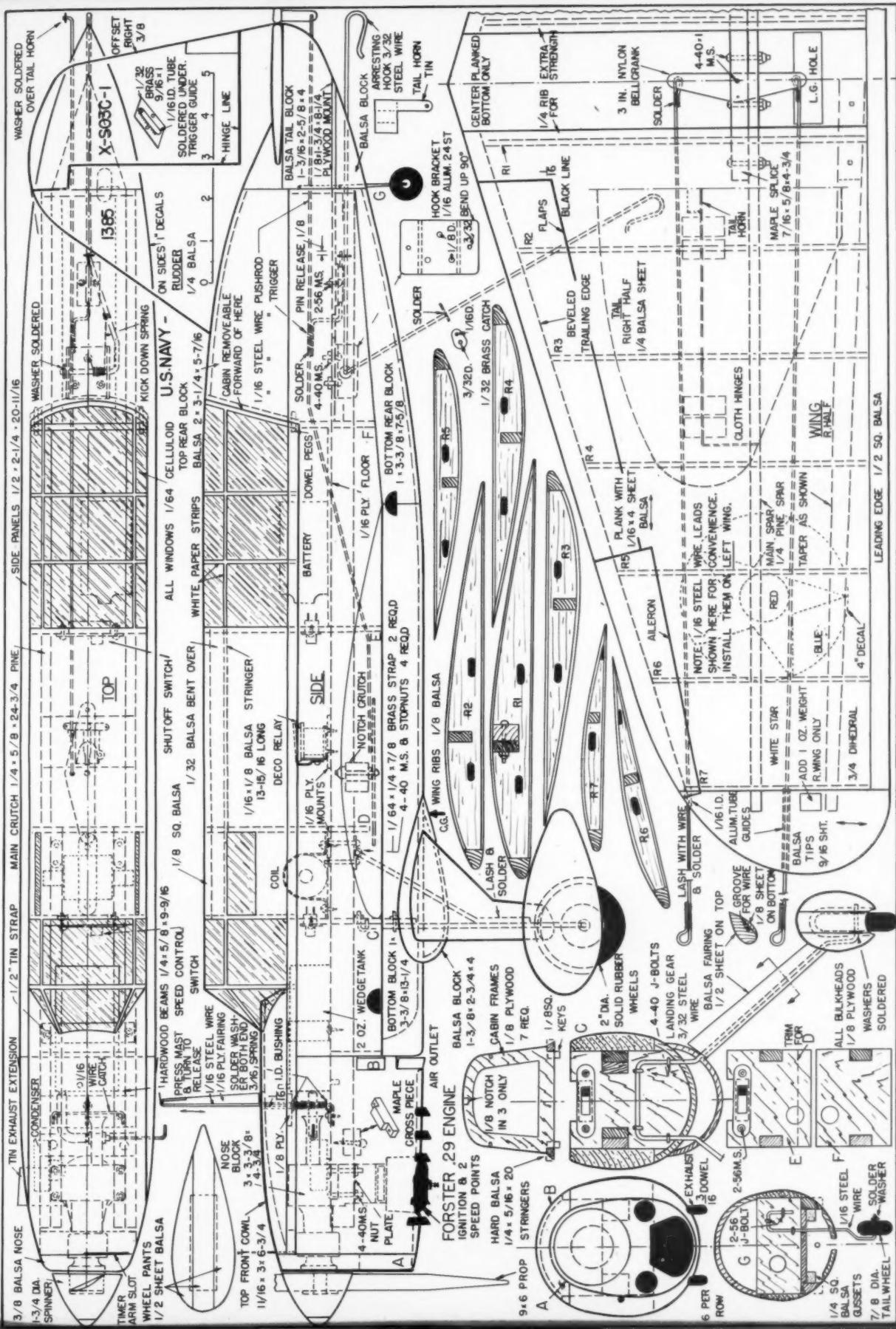
Powerplant is a two-speed Forster on ignition, selected for its suitability for this type of flying. Other engines of .29 to .49 displacement may be used. On the Forster, high speed is 65 mph.

Below—Original model finished by coat of clear dope, sanded with #400; covered with Silkspan, clear dope, followed by sprayed on Nason's auto lacquer primer-surfacer, #400 sanded. Spray.



► Since its inception three years ago, the U. S. Navy carrier model event has been growing in popularity because it offers a challenge to a builder in construction skill and flying ability. Along with radio control and team racing, the carrier event takes its place as a thrilling performance enjoyed by both flier and spectator. There is a tense feeling in the air, as a pilot starts up the motor on his scale ship. Some of the models have a year or more work on them and all this can be lost in one disastrous split-second on an error. Pilot guns his plane off the deck, sometimes dropping a little upon leaving it just like a real one. Ship may appear to hang suspended for an instant before flying speed is reached; then prop takes hold and away it moves on the high-speed run. On completion of this run, pilot receives an O. K. signal from the Navy deck officer, drops arresting hook, and cuts throttle down to low speed for the slow run. Again the up-raised thumb O. K. signal and pilot begins his approach to land on the deck. Playing it safe he comes in too high on the first try and goes around for another pass. A slight wind is blowing now and ship drops on the downwind side. Quickly pilot guns throttle and hops clear over the deck as the up-wind causes plane to balloon or float. Patiently he goes around for another pass. This time he is in the groove and you can tell

(Continued on page 40)





Kentucky's finest, says the Association of the field. When grass cutting became a problem, the club bought a tractor for \$200. More time for flying.



If it flies on wires, it's here, from stunt and speed, to scale. Members include professional men of over fifty years of age, kids of five. When

Below—Tuning Mosquito for flight is Bill Lenzer, left, Harry Rogers, Harley Gribbell. Senior members (over 20) pay \$3.50 dues, Juniors \$1.50.

the tractor purchase was discussed, Marvin Wander, ten-year old member of the Board of Directors, asked, "Are we able to maintain payments?"



► Marsden H. Gribbell is Director of Census and Attendance for the Covington, Kentucky Board of Education. To the errant schoolboy this lengthy title means that Marsden H. Gribbell works in collaboration with the most feared of all men—the Truant Officer. On the third Thursday of every month from eight to ten thirty in the evening, Marsden H. Gribbell becomes "Grib" to 55 men and boys as he presides as president of the Northern Kentucky Model Flying Association. Between meetings and when not attending to the chores of his office with the Board of Education "Grib" builds planes—gliders, rubber-band models, power jobs and jets.

Grib is a "bug" and proud of his hobby. He likes to relate how he once took his family on vacation and, as all model builders do, threw a couple of kits in the trunk of his car "just in case." Arriving at his destination Grib proceeded to unload the plane kits first; that was as far as he got on the vacation. For the next two weeks he worked on the models and, as his family said, "He didn't even see Lake Michigan."

At meeting time—model plane enthusiasts ranging in age from five and a half years to well over 50, draw up chairs around a large table at the far end of the huge Rio Rita club room. Rio Rita by The Lake nestles in the hills, about five miles from Covington, Kentucky, and is visited by plane fliers, trap shooters and anglers. An old farm house, it has been converted into a sportsman's paradise. There is a well stocked lake for the fisherman, a trap shooting range for the gunner and a three ringed flying field for the modelmen. Ted Miller, owner of the Club and (Continued on page 44)



A senior membership includes all members of the family. The flying Dudley's, Mrs. Sue, Tansil, and daughters Folly, age 11, and Linda, age 8.

# Rio Rita by the Lake

by RICHARD WHEELWRIGHT



The Club's staff: L to R—Larry Rogers, Treasurer; Harold Skinner, Vice-Pres.; Marsden Gribbell, president and local truant officer; and Larry Baarlear, secretary. Mr. Baarlear is holding a Howard Hughes racing plane.

**It's an old farm converted into a sportsman's paradise. Fishing, trap shooting, a three-ring**

**field for the modelers. There the Northern Kentucky Model Flying Association holes up.**

Youngest flying member, five-and-a-half-year-old Teddy Heuser, and his dad, Ben Heuser, pose together with a couple of well proven friends.



# Pushalong

by HAL ROTH

**Designed for the new AMA rubber model rules, this ship is a refreshing change from the year-in and year-out tractors. It's a swell flier and worth a try.**

► Pusher canards fly well, are fun to adjust, and always cause a lot of commotion at the flying field. *Pushalong* is designed for the new AMA small rubber class. With a power/weight ratio of over 60 per cent, power flight is excellent. The propeller at the rear can be made very light; it never breaks or is even nicked.

**Fuselage:** Make two identical sides with  $1/8$ " sq. longerons and  $1/16$ " x  $1/8$ " crossbraces. Lay crossbraces in the same direction for both sides. When dry, turn one side over. Assemble, using a straightedge to insure alignment. Go over and cement each joint. Sand smooth. Build  $1/4$ " left-thrust into propeller block.

**Wings:** Cut out ribs. Taper trailing edge and notch for ribs. Block up front of trailing edge  $1/32$ " during construction. Add spar(s) and dihedral.

**Propeller:** Lay out block. There is no side taper. Carve left-handed. Make back face first. Cut in  $1/16$ " undercamber. When back face is completed, hub can be cut in to a width of  $9/16$ ". Add .010 brass fittings.

**Wing Mounts:** The front mount is simply  $1/8$ " x  $1/4$ " crossed over the top of the diamond fuselage. Measure three degree incidence with a protractor. For rear wing mount, cut out  $1/32$ " sheet tear-drop template. Form soft  $1/32$ " sheet (vertical grain) around platform and carve to shape with

**This interesting pusher climbs in wide righthand circles which gradually straighten out as power is expended. Move wing for climb adjustment.**

The power performance is top-notch due, says the author who is shown here with the airplane in the article, to a power-weight ratio of 60%. Rear located prop never breaks and rarely is even nicked.

a sharp razor. Add .040 wire hooks. The rear wing mount is movable for adjustment.

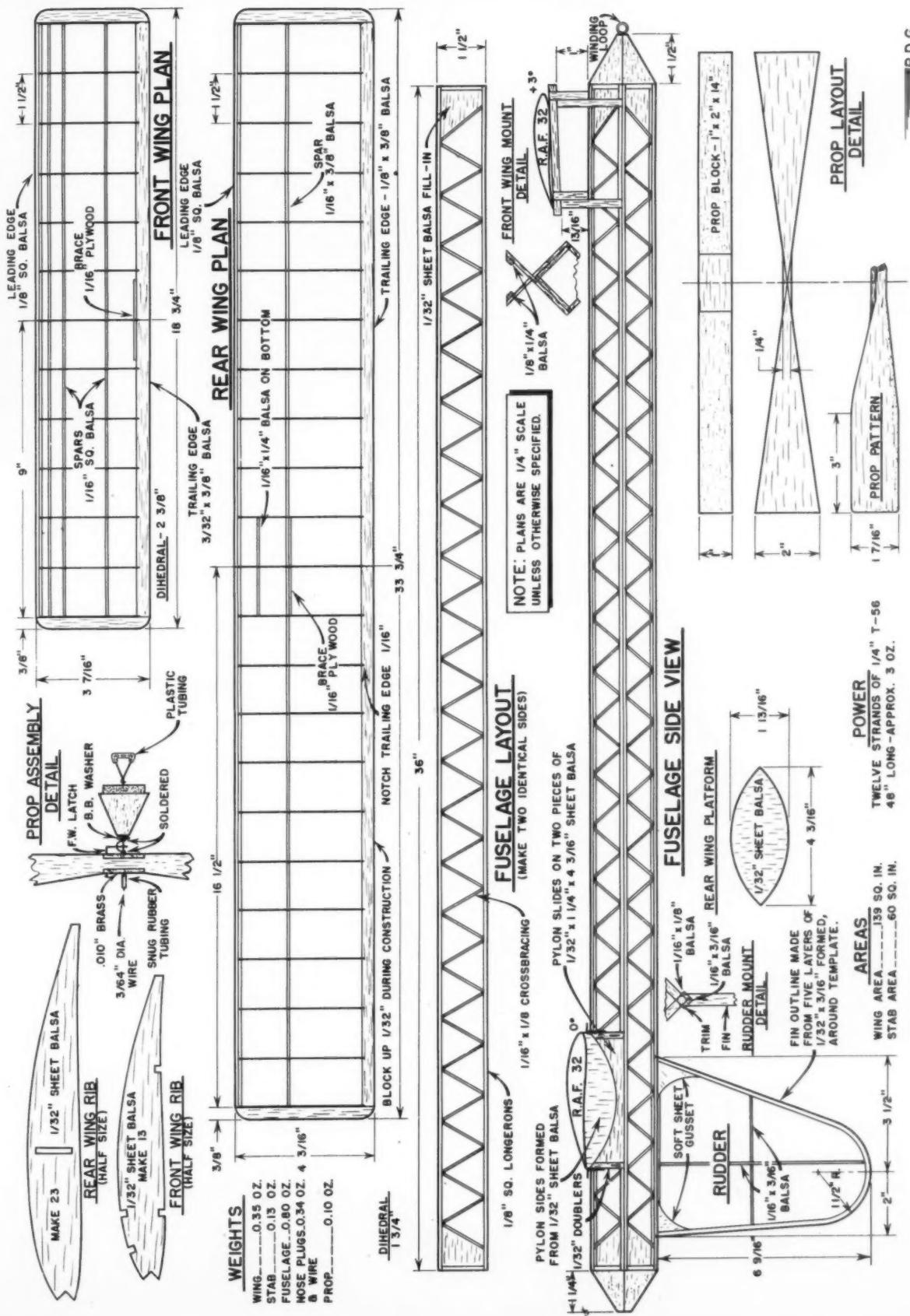
**Wire Works:** Use  $3/64$  wire (easy to bend and amply strong) for propeller fittings. Bend S-hooks for rubber motor fastenings and cover with half A gas line tubing. The propeller is removable by taking off a short length of rubber tubing (see sketch). Clean wires well before soldering the freewheeling loop. Use acid to ensure a good joint.

**Covering:** Cover model with Jap tissue if possible. On the fuselage, run the grain vertical. Dope twice with thin dope.

**Flying:** With front wing fixed all the way forward and set at three degrees and the rear wing at zero degrees, try a few hand glides in tall grass. The model is wound from front nose block and held by putting a wire rod through the freewheeling loop. Center of gravity is located further aft of center of the rubber motor than in a tractor because the main structure weights are in the rear. Because of this the thrust offsets need be increased. With  $1/4$ " left-thrust (to stop righthand dives), wind 40 winder turns. The model should climb in large right circles which gradually straighten out as power decreases. Adjust for climb or dive by moving rear wing. Move it only  $1/16$ " at a time; it is a very effective adjustment. The power run is over two minutes. I have never fully wound it. Pop-up front wing for a dethermalizer.

One unusual factor in pusher flying is the rearward center of gravity which requires relatively large thrust-line adjustments for same effect.



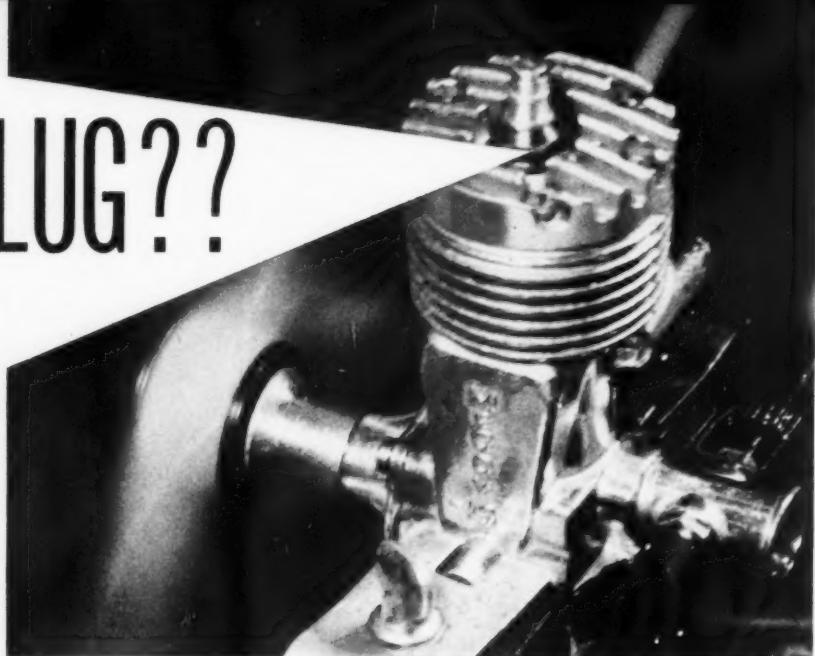


# WHICH PLUG??

?

**Glow plugs have tremendous affect on the way an engine runs and starts. The engine may not run with wrong plug-fuel combination. Things you need to know.**

by TED MARTIN



## TYPE OF PLUG IN ORDER OF HEAT RANGE

### 1/4-32 SHORT REACH

HOTTEST	ATWOOD STD.
	SPITFIRE
	OHLSSON HALF A
	ATWOOD (NEW TYPE)
	K & B STD. +
	OHLSSON RACING
	THIMBLEDRONE HOT SPOT +
	K & B EVERGLO +
	CHAMPION VG 3 +
	OHLSSON STD. +
	K. L. G.
	ARDEN

### 1/4-32 LONG REACH

HOTTEST	OHLSSON RACING
	CHAMPION VG 2 +
	OHLSSON STD. +
	ARDEN

### 3/8-24

HOTTEST	OHLSSON RACING +
	CHAMPION VG 1 +
	OHLSSON STD. +

+ DENOTES ABILITY TO WITHSTAND 2 VOLTS FOR STARTING

► Many winter fliers who have experienced great difficulty in starting glow plug engines out in the open, particularly when a cold wind is blowing on an uncoupled engine, have found that by moving into a sheltered spot, starting from cold is accomplished much more easily.

This is due to low air temperature reducing the volatility or degree of vaporization of the fuel. The plug is unable to provide sufficient heat to adequately improve this condition to the point where ignition will occur.

The three factors already discussed, namely fuel, compression ratio and plugs, can all be adjusted to remedy this cold starting trouble. Ether could be added to fuel, compression could be raised, or a hotter plug fitted. However, it is probable that once engine has warmed up there would be a loss of power owing to early firing from too much heat. Therefore, it is desirable to have some temporary means of temperature adjustment for extreme cold weather starting.

One very successful measure is to keep handy a small oil can of anaesthetic ether and give the engine a shot through exhaust and intake. Once engine has started, it will usually continue to run on its normal fuel. Ether, being extremely volatile and inflammable, will ignite at relatively low temperatures, and at low compression ratios, which is why it is a vital ingredient of model diesel fuels.

Once started, motor may seem erratic and reluctant to give full power, regardless of needle valve adjustment, in comparison with its behavior in normal weather. These are indications that the heat setup of the engine is too cold, and, as mentioned in the last article, exhaust glow will be weak and variable, and engine will hunt. If you intend sticking to the "one compression ratio, one fuel, change the plug" procedure, the problem is quickly and easily solved by fitting a hotter plug.

To enable you to quickly choose a suitable plug, we have tested a representative collection with a view to establishing the heat value of each type in relation to others, thus enabling the compilation of a plug chart similar to that for automobile plugs. All you have to do is look up the plug you are using in the chart, if your motor is running cold, change to next hottest plug on the list. Conversely, if overheating is the trouble, change to the next coolest. If used correctly, this chart should help to adjust your motor to give near top performance under any climatic conditions by simply changing plugs.

(Continued on page 42)

# Rudolph...

by  
DICK  
SCHUMACHER



Top—The full name, senners, is Rudolph, the Red Nosed RC, thanks to red spinner. Above—Junior shows how easy—heh, get away from the Torp!



A medium-sized ship, Rudolph is a truly functional design, as simple, sturdy, and practical as you can get. Shock absorbing gear is important.



Points to note: MacNabb 465 installations; sponge crash pad; Bonner compound; engine control escapements. Batteries accessible from nose.

**For its sound, no-frills, structural design and smooth flying, we highly recommend this RC.**

► *Rudolph* is a contest radio control design with a background of five years intensive work that has covered a series of ten ships. These ships have ranged in size and weight from 6 ft. 6 inches at 6 lbs. 12 oz. to 33 inches at 13-1/2 oz.

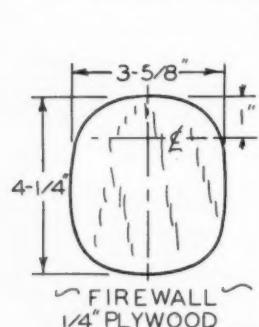
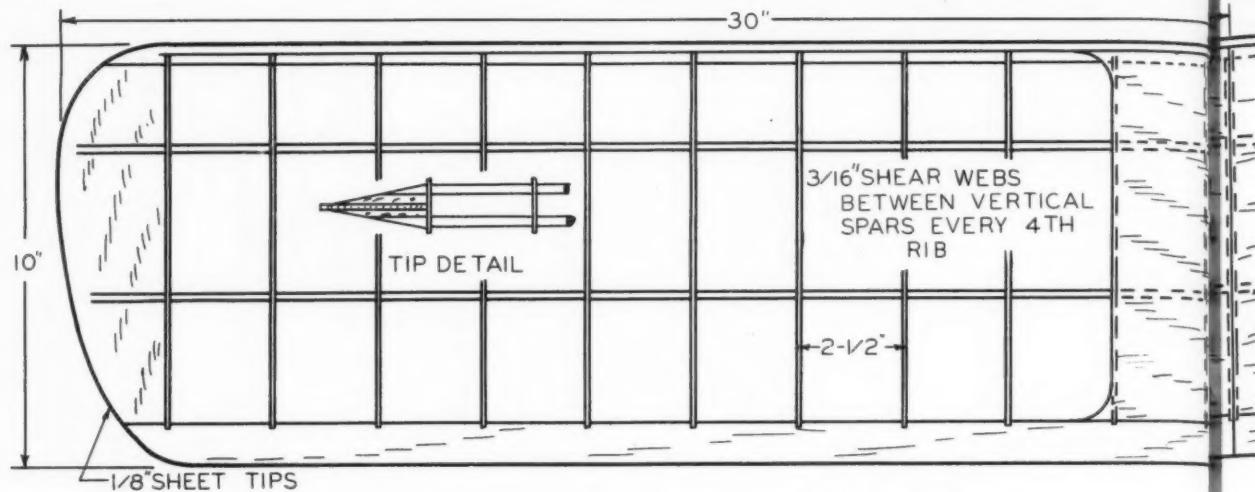
Control of all has been by single channel radio operating the simple rubber-driven escapement, although the escapement has varied in form from the original development of the Ruddervator to the simplest two-position escapement. Now the most advanced unit available is the Bonner-Owbridge compound escapement, described in the June 1952 M. A. N.

Aerodynamically, *Rudolph* is designed around what I call the "Brute Force" concept. That is, for our simple control

systems and lack of feel of the aircraft, a boxy ship that tends to fly at a constant and small speed range is definitely easier to handle and is smoother flying than a streamliner that changes speed easily and rapidly when the nose goes down, as in a turn. Of course, the box tends to fly slowly while we want speed for wind penetration. However under power is easily provided by the "brute force" of today's efficient power plants and in the glide by good old mother nature in the form of gravity and high descent speeds. These high glide and descent speeds have several advantages, namely more consistent control reactions, greater precision in

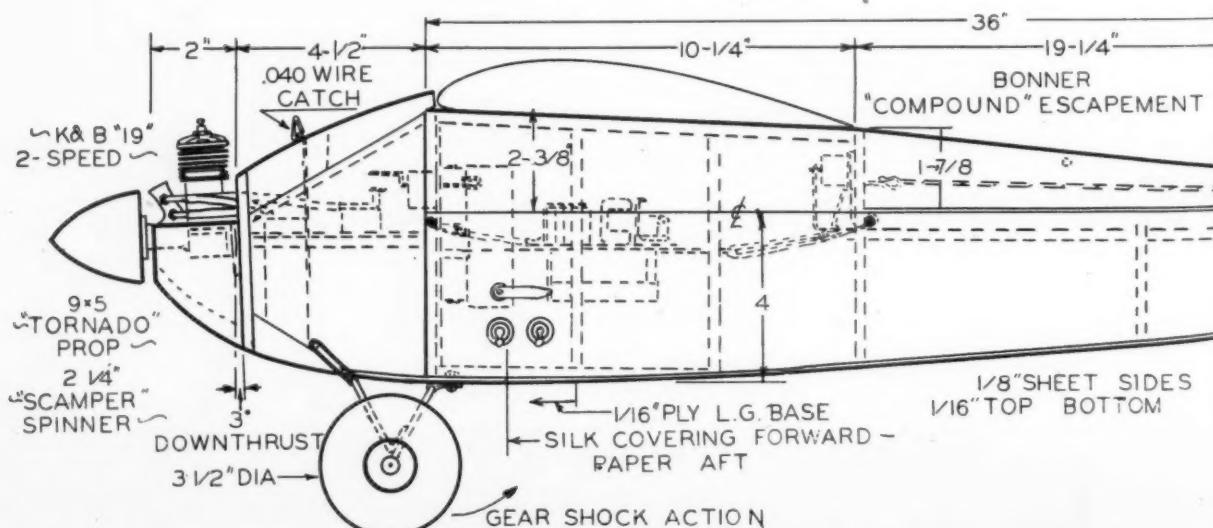
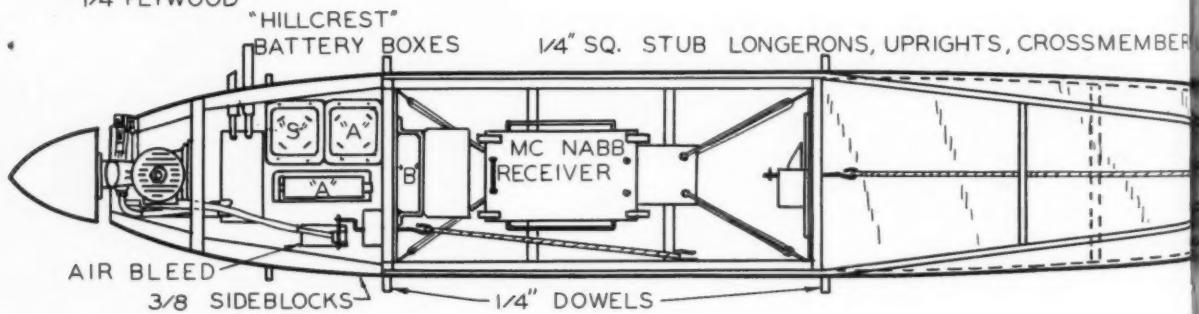
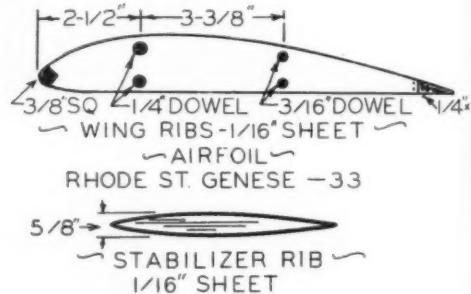
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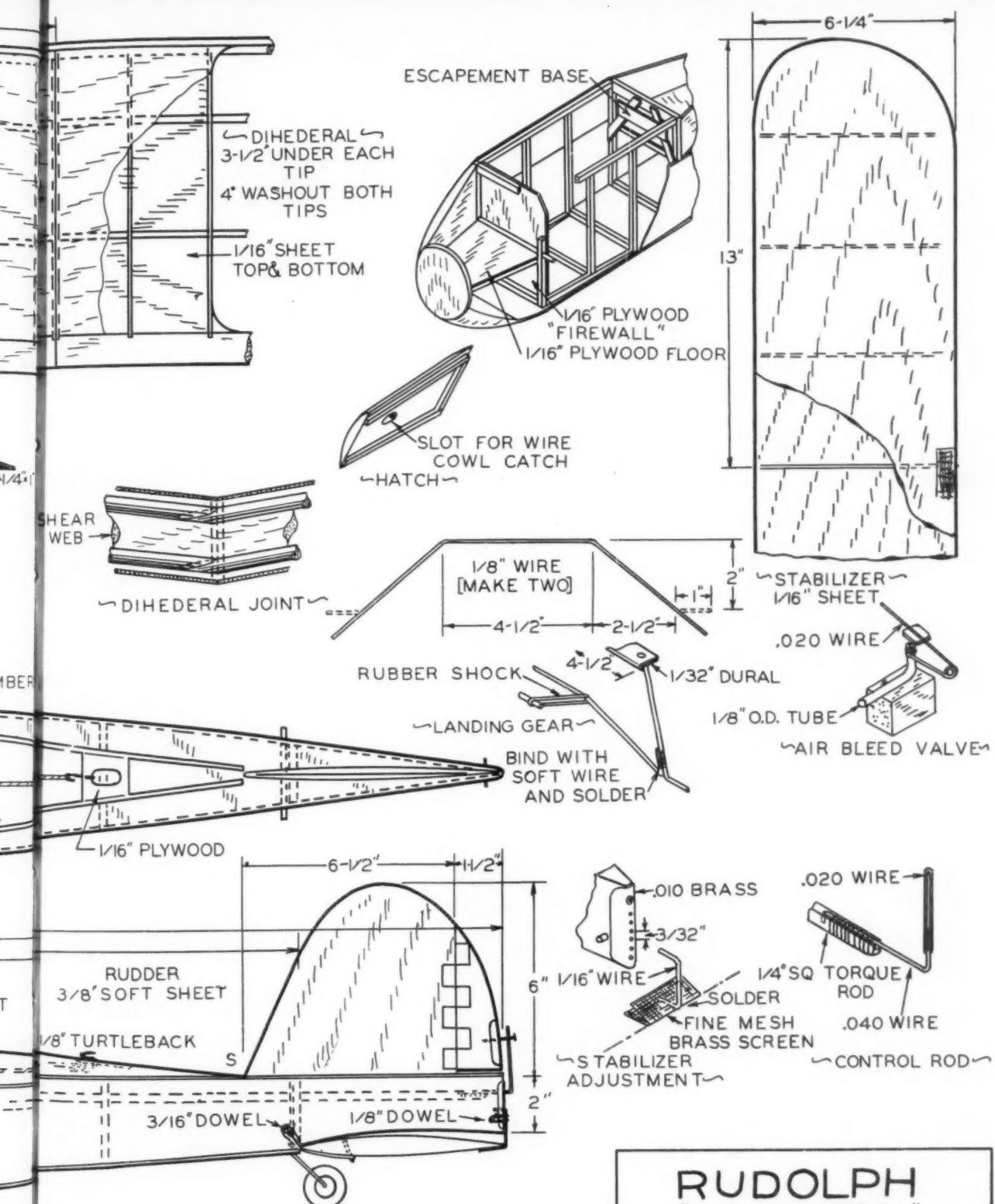
Plan on following two pages.



— AIRFOIL ORDINATES —

%	UPR	LWR
0	3.20	3.20
2.5	6.80	.79
5	8.30	.35
10	10.50	.00
15	12.05	.00
20	12.29	.00
30	12.99	.00
40	12.40	.00
50	11.40	.00
60	9.79	.00
70	7.80	.00
80	5.40	.00
90	2.70	.00
100	.00	.00





**RUDOLPH**  
"THE RED NOSED R.C."

SCALE



BY DICK SCHUMACHER



WANT 1

Just

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Costs a ~~th~~  
...worth ~~co~~

TESTORS  
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MEDIUM

TESTORS  
DOPE  
TRUE BLUE  
NO. 16  
TESTOR CHEMICAL CO. ROCKFORD, ILL.

TESTORS  
DOPE  
METALLIC MAROON  
NO. 20  
TESTOR CHEMICAL CO. ROCKFORD, ILL.

TESTORS  
SANDING  
SEALER  
NO. 25  
TESTOR CHEMICAL CO. ROCKFORD, ILL.

TESTORS  
DOPE  
INSIGNIA WHITE  
NO. 24  
TESTOR CHEMICAL CO. ROCKFORD, ILL.

TESTORS  
DOPE  
MEDIUM GREEN  
NO. 2  
TESTOR CHEMICAL CO. ROCKFORD, ILL.

TESTORS  
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TESTOR CHEMICAL CO. ROCKFORD, ILL.

# THE BEST?

Get on

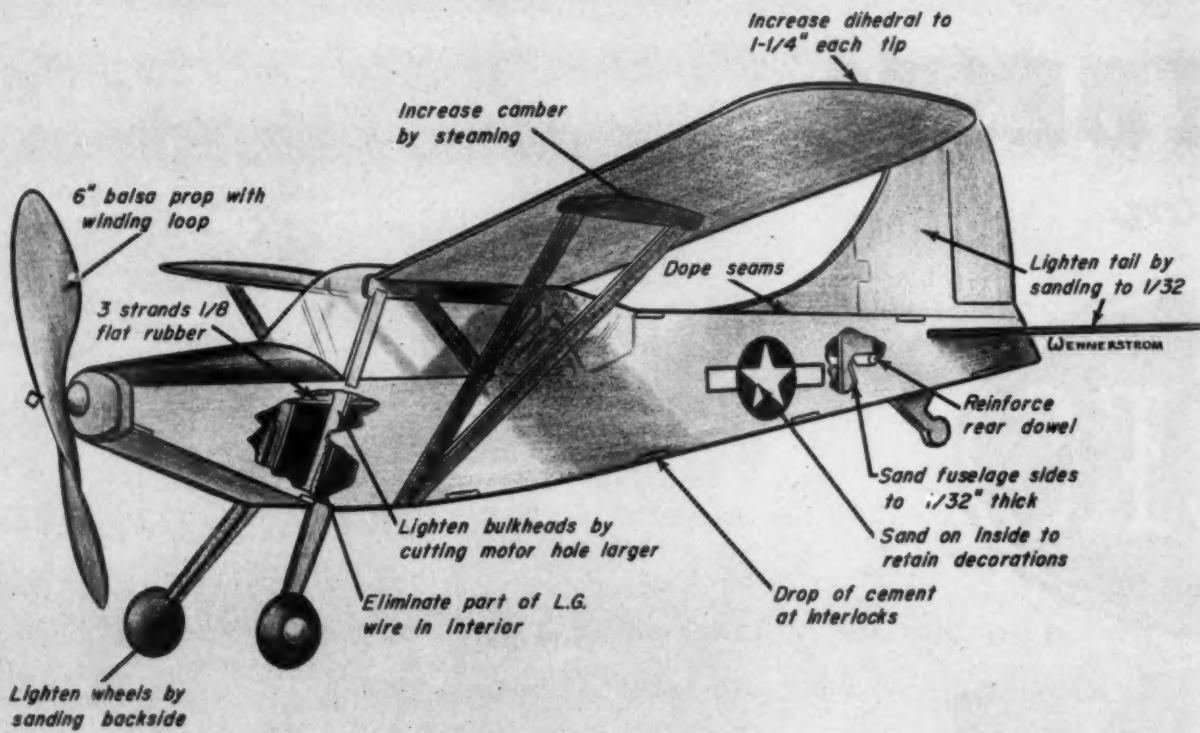
# TESTORS

# DOPE

Pyame

a little more...  
much more!





Hot rodding the kit parts by the illustrated methods, youngsters of less than nine years of age have turned in times better than 20 seconds indoors.

# FUN! with Pre-Fabs

by JOHN L. MACKENZIE

**Inexpensive prefabricated kits are making history in the Cleveland area. What the kids are doing to—and with—these airplanes will make many an expert model builder bug out his eyes.**

► The boys in Cleveland are contest flying those little all balsa pre-fabricated kit models! What's more, they have gotten official times as high as 52 seconds. These kits, which many of us may have looked upon as dime store novelties, have turned out to be the most successful means of introducing beginners to the fun of contest flying that has ever been found in that area.

It all began early last year when the *Cleveland Press* announced plans for an annual indoor air meet. Charles Tracy, aviation editor of that paper, consulted with the Cleveland Council of Model Aeronautics, seeking ideas to encourage younger boys and girls to enter his contest. Allen Vopal, Council president, came up with the most likely proposal. He suggested that an endurance event be held for models of the simplest type construction available in kit form. The pre-fabs seemed to fit this requirement very well. So events were planned for three age groupings, 9 and younger, 10 and 11, and 12 and 13.

That first meet definitely established pre-fab as a practical type of competition for beginning modelers. There were more entries in these events than in all others combined. Scores of youngsters who had never built a model airplane before were on hand for their first fling at competition. Endurance times were not spectacular as such things go; 23 seconds was the best. But everybody had a load of fun.



Small fry contestants ready a pair of Top Flite jobs. Note the carrying box and winder! There are three groups: up to 9, 10 and 11, 12 and 13.



Girls make a good showing, too. Chuck Tracy of the Cleveland Press ramrodded through this event after oldtimer Allen Vopal kicked in the idea.

Many models never made a successful flight, but their youthful builders saw what could be done with pre-fabs. Furthermore, when those kids got their eyes on the trophies, of which there was a beautiful array, the contest germ took hold. And that of course was the desired outcome.

Tracy repeated his contest in January of this year with even greater success. Many of last year's beginners returned as pre-fab experts, and another large crop of novices got started. Performance of the models advanced tremendously. Richard Collins, a 13-year old flying in his first contest, turned in a record time of 52.2 seconds. This from an all balsa cabin job flying indoors! Even in the youngest class a 25-second time was racked up. More than 100 pre-fabs flew in that contest.

Veteran modelers who have watched these pre-fabs perform have been intrigued by their possibilities. More than a few have taken a flier at building them. We got into the act ourselves by presenting our eight year old with his first kit a few months ago. We were surprised at the simplicity of assembling one of these models and found that even a boy of that age can do a creditable job with a little supervision. We learned that pre-fabs are fun for anybody. They are inexpensive, require very little time to build, look realistic and fly well.

Let us pass along a few pointers on pre-fab building,



Top man in prefabs is 13-year old Dick Collins, whose 1/2 ounce Luscombe Sedan reached the 90-foot ceiling for a sensational 52.2 seconds.

gathered from boys who have had the most success in flying them. First, choose a type of plane that lends itself to good inherent flying characteristics. High wing, long fuselage types have shown best results. Dick Collins used a Luscombe Sedan for his record breaker. The Stinson Sentinel has also given excellent results. The kits are necessarily designed for mass production and packaging. Thus every piece is stamped from 1/16" sheer balsa. All of these parts should be sanded to half this thickness, and in some cases even thinner. Here skill of the individual builder plays an important part. It is important to make tail surfaces and rear portions of the fuselage as thin as possible. That will enable you to eliminate use of weights in the nose to achieve proper balance in the balance in the final assembly. Do most of the sanding on the unprinted side of the wood to retain the decorative pattern of the model. Interior bulkheads may be lightened further by drilling holes or cutting away all but a rim of balsa.

Split the wing at the center with a razor blade and cement it back together with a greater dihedral angle. The original angle was limited by size of the kit box and is hardly adequate for good stability. Don't try to increase dihedral by steaming and bending, since that method tends to flatten out camber of the wing. A satisfactory angle will be obtained by laying half of the wing (Continued on page 46)

# A mighty LONG Line

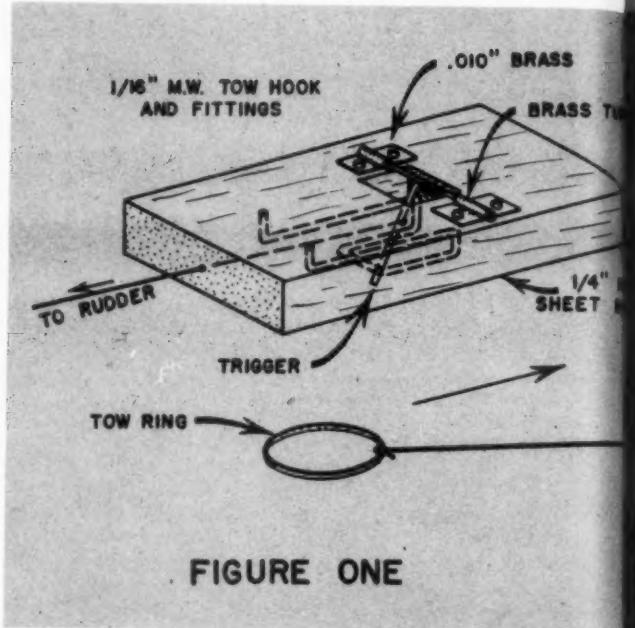


FIGURE ONE



Czepe-type championship glider, G. Scalla, Graz, member 1952 Austrian team.

by LAWRENCE CONOVER

**America lags in glider development, claims the author and, if you've tried a 300-foot line, you'll agree. But something can be done about it.**

► Modelers in this country are back in the dark ages of towline glider flying. Something must be done about it. As concentrated effort in the Wakefield event has greatly increased the caliber of our rubber modelers, so could stimulation of glider events do the same thing. To the serious modeler stiff competition well met is the greatest challenge and the greatest goal. We must therefore have at least the ability, to compete in international glider contests. As present standards our performance is far below par.

At our 1952 Nationals top time in this event was a total of 13:42, this flown with thermal weather a ten-minute per flight limit. Compare this with times in the World Glider Championships in Austria 1952. With a five-minute per flight limit and poor weather (compared to ours) Bora Gunic came through with 14:08 total. Some European models are capable of still air times near the five-minute mark. Check British National Averages for glider in 1952. They are a compilation of all contest flights made by an individual during that year, in all kinds of weather, most of it bad. The top man, Bill Farrance, had 4:17 per flight average, and the next ten men were between three and four minutes. How would we rate?

Have you ever used a 328 foot towline? Or even 300 foot? If you haven't, I'll tell you about it. By closely following English model mags and by correspondence with a modeler over there I finally arrived at an arrangement with a towliner which achieved (usually) a straight up tow and release overhead. This was with a 200 foot kite string line. At one of the contests we were allowed unlimited length. I tried 300 feet. I saw my model and launcher recede far down the field as the extra line payed out. The string had so much sag and weight that I thought the nose would never come up. (And this with hook near C.G.) I've done most of my towing with short runs and then let the wind do the rest as I stand expectantly watching the model pulled up overhead. A quick flick of the line and the model is off. But not so this time. I ran like crazy as the model climbed lazily to about 40 degrees above the horizon. That was all. Medium wind too. The point is: We need to develop more than just towline length.

I have noted that at all contests we attended this year (eleven including the Nats) only ten percent of the con-

NOTE: THE BASIC IDEAS CAME FROM ENGLAND.

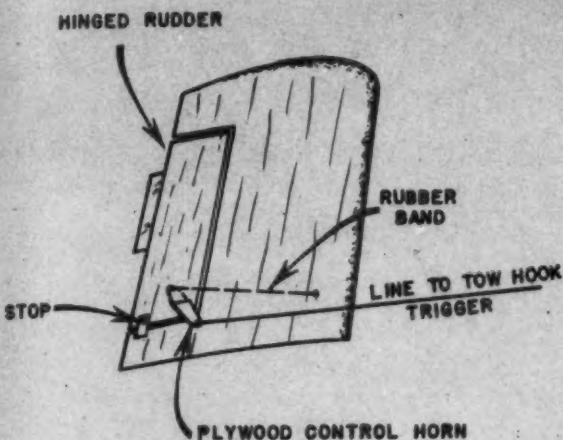


FIGURE TWO

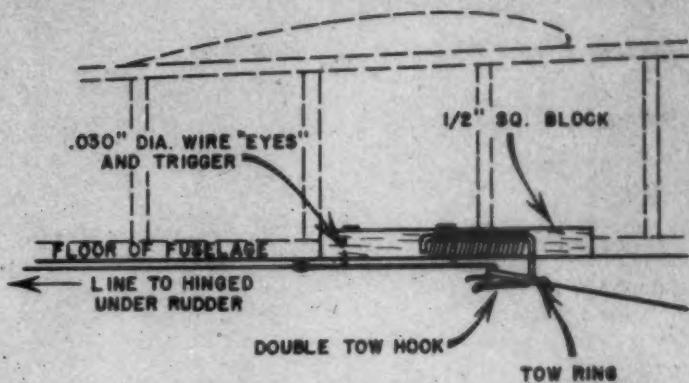


FIGURE THREE

P.D.G.

testants achieved overhead releases. Even these few were inconsistent. Many can hardly get half the altitude of the 200 foot line. For those who ask, "Why then the longer line now?" I can answer in three parts.

1. The short towline keeps glider well below the altitude reached by both rubber and power models. Thermals are larger and stronger above this limit. With this restriction many modelers just don't bother with towliners. I have been pushed out of first places more than once by lucky (unduly) thermals caught at some glider's maximum tow altitude of 50 to 75 feet, this when I caught a downdraft from a 200 foot overhead launch. If you would watch weather carefully all day you might possibly wait out the good conditions, but who has time for this when many events must be flown and timers aren't available? An equalizing factor for both lucky thermals and high climbing power models is needed to stimulate interest in towline glider events.

2. The longer line would necessitate development of designs and devices for a straight stable tow. This is perhaps the greatest deterrent to high class glider flying in this country. Most fliers now manage to worry their ship up part way and then hope for that low lying thermal. With the longer line a few modelers with initiative will show up using good towing methods and earn the thermal flight. They will walk away with the honors.

3. With work on towing devices there will naturally come more thought on glider design itself. This type of model aircraft lends itself to sleek lines, well calculated curves, and planned efficiency. It is worthy of your effort for the glider is close to the soaring bird in nature. To imitate this is a wonderful experience.

With use of a longer line comes the issue of nylon line. It is an essential tool in top flight towing. No other material compares for light weight and low air resistance, and strength. Wire is too dangerous with power lines around most airports. The cord we use now becomes far too heavy to handle if lengths exceed 200 feet. Perhaps we should look at the reason for the banning of nylon line. Some years ago (in the 100 foot era) a few modelers, Dick Korda included, were sharp enough to find that you could get an extra 50 feet of altitude by 'leading' the model at the top of the nylon line. Nylon stretched slightly as excess speed was built up before

release. The resulting zoom gave quite an advantage in altitude. The room in fact gave much more height than the small percentage of stretch. Little did rule makers realize the downdraft they caused in towline glider development when they abolished nylon line. It is easy to see that one must have a good towing method and a stable aircraft to take advantage of this type maneuver. If this condition would have continued more model builders would have caught on and we might well be on even terms with experts across the way.

The sketches indicate some basic methods for an auto-rudder system. Initially it is a gadget which pulls rudder straight when tension is on the towline and model is going up. When the line drops off, rudder returns to its glide position for circling flight.

Sketch No. 1 shows the tow hook assembly which can be fitted to any of your gliders as soon as you find the right position. The tow ring pulls trigger forward. A line from the trigger to rudder horn transmits this pull and straightens out the rudder. You may find it necessary to put a small rubber band in the rudder line to allow for slack. You must arrange a definite stop to control amount of rudder movement. A screw adjustment on this is

(Continued on page 40)

Typical British Nordic, Tadpole, by Bob Lane. Span 69, length 54, weight 15 ozs. Sketches, top, show improved gadgetry that will help tows.



## ENGINE REVIEW



# McCoy Diesel

*America's first modern diesel proves well designed, easy starting, smooth running, and plenty powerful.*



McCoy's .049 combines design features of the best present day diesels with several interesting innovations. Parts, above, reveal general sturdiness throughout.

► *Editor's Note*—These tests were made before McCoy's diesel fuel became available. The fuel mixture used in the tests was a "home brew." McCoy's fuel will prove superior to any typical home blend, particularly because of the presence of one ingredient not generally available, and of the proportioning of ingredients for a degree of power not ordinarily realized by American users of diesels. The report follows:

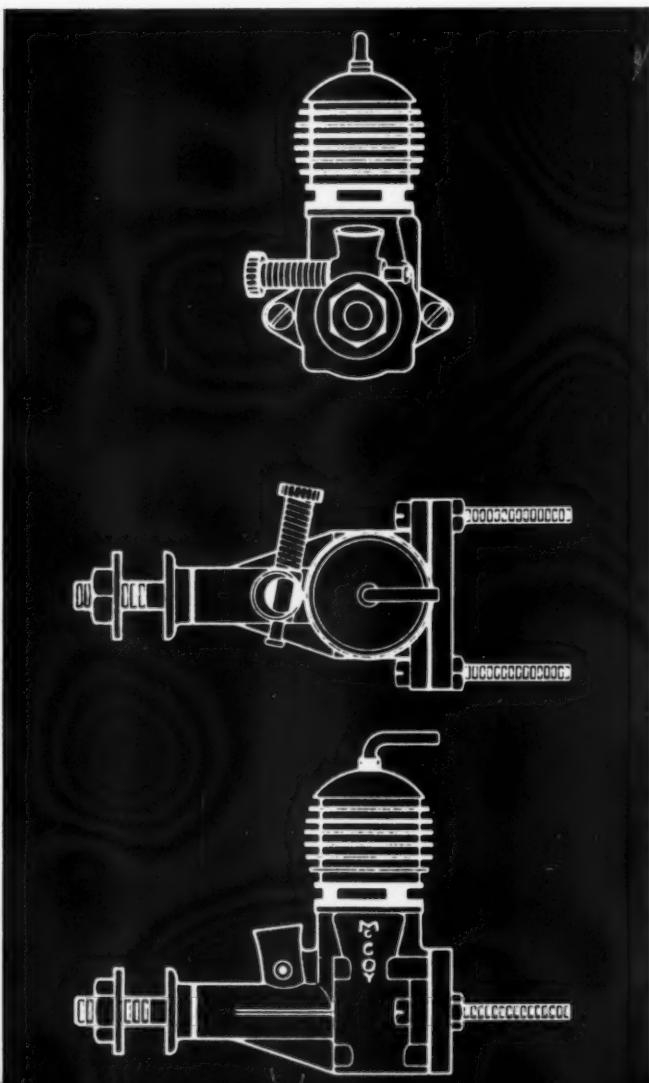
Subject of this month's test is a motor that has been eagerly awaited by enthusiasts all over the world, and is destined to make modeling history.

Events leading up to this appearance of a hot U.S. diesel began at the end of World War II when the Swiss produced the first model compression ignition engine, and thereby sparked a complete revolution in gas model design. Engines could be self contained. Ignition was eliminated. The small power model became a reality and youngsters of Europe at last were able to enjoy the fun of owning an engine. Meanwhile, U.S. manufacturers analyzed every available engine, Swiss, Italian, French, English, and came up with the conclusion that the diesel was inferior to then current American ignition engines. With several exceptions, notably the Drone, the diesel was rejected, and the appearance at this time of the Arden glowplugs sidetracked any U.S. diesel. The glowplug enabled performance far in excess of that produced by any diesel at the time.

However, by long and patient development in Europe, the modern diesel has become a machine that, for most purposes, is the equal of any glow engine, and for certain applications, a great deal better.

At the present stage a good diesel will outperform, on a horsepower displacement basis, anything under .29 displacement. However, it has not had the ability to produce the high rpm of glow engines. When it is developed further, and it will be, a diesel peaking at the same revs as a similar sized glow motor, will produce nearly twice the power. It certainly will be no small task to develop a diesel to beat the mighty .60 cu. in. racing engines.

(Continued on page 48)



**Look, Fellows!**  
There's a Handful of  
Fine Detail and Realism  
in Every  
**MONOGRAM**  
**KIT!**



A handful of molded plastic parts from Speedee-Bilt Thunderbolt kit. Plastic canopy also included. More than 50 separate parts in this kit.



Speedee-Bilt Panther Jet • \$1



Speedee-Bilt Thunderbolt • \$1



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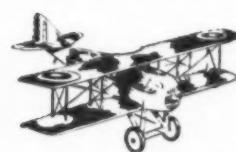
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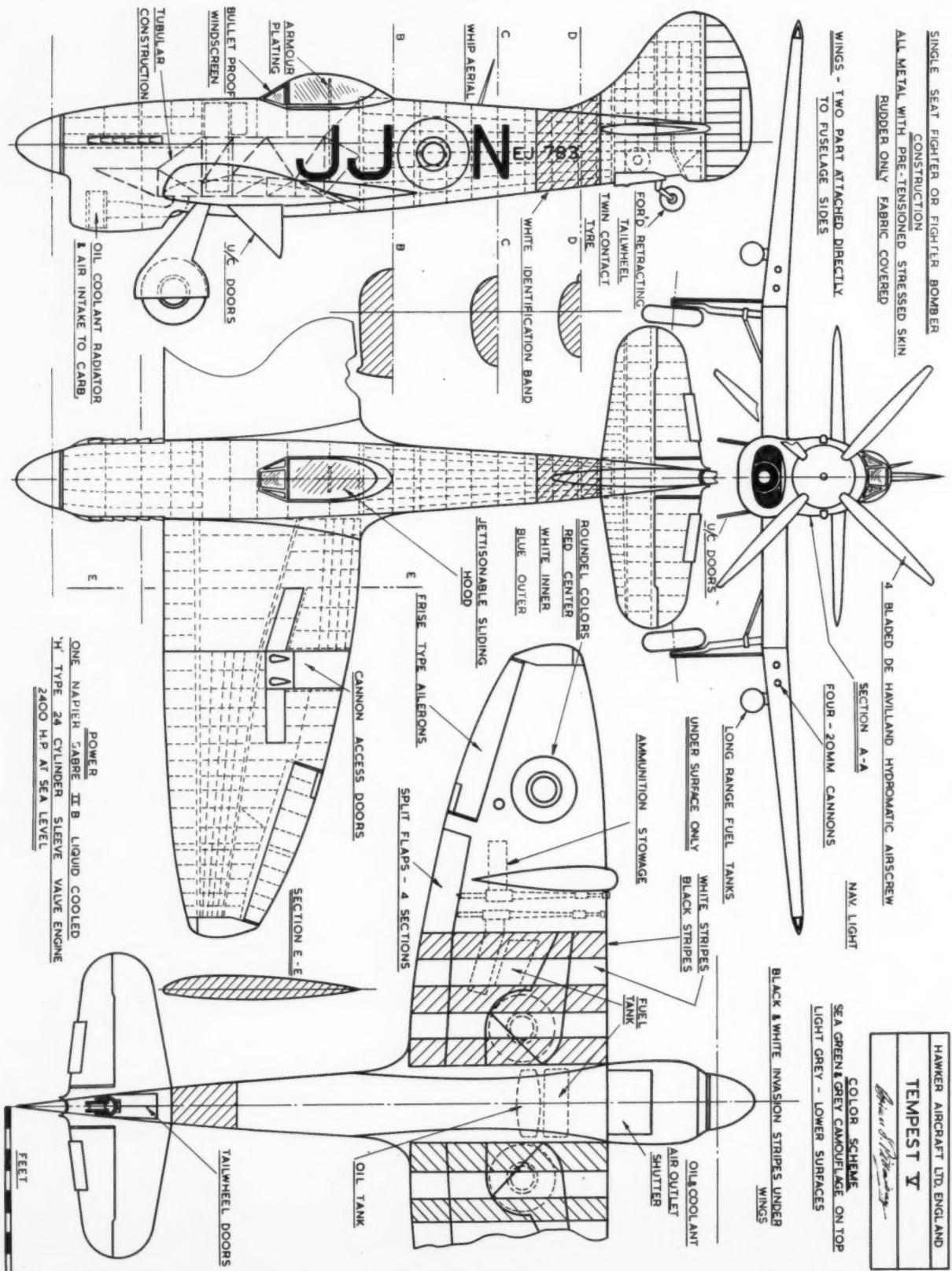
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Superkit Thunderjet • 89c

# Planes Worth Modeling —

## TEMPEST V



## Duranita . . .

(Continued from page 15)

rock steady, a little faster and with more climb. After that flight, we were satisfied that there were no tricky adjustments required, so we flew the rest of the morning, changing rudder settings to get difficult flight patterns from tight left circles to straight flights to right circles, made a few takeoffs from the ground, and finally quit flying when we ran out of fuel.

Although the appearance of the *Duranita* is unusual, construction is strictly standard stuff. Study drawing for general arrangement and wood sizes, and it's easy. The fuselage is a box type, with sheet balsa sides, top, and bottom, with cutouts in the sides for lightness, and then the whole structure covered with paper. Braces are cemented to strategic locations on the sides where heavy stresses might be imposed. The standard wire landing gear is firmly attached to a plywood bulkhead which in turn is cemented to braces on fuselage sides. We had a big hunk of block balsa which we carved and hollowed out for the cowl, but it can just as easily be built up with several smaller pieces if you prefer. Just keep grain running along fuselage line. Another thing—if you can't get any  $3/32$ " sheet balsa wide enough to make the sides with one piece, you can take two pieces of  $3$ " wide sheet and cement them together to make one sheet  $6$ " wide. Bracing on the sides will take care of any stresses which might be imposed on the joints between the two sheets.

Vertical fin is made from pieces of  $1/8$ " sheet. Drawing shows direction of the grain. Sub-rudder should be very hard stock  $1/8$ " balsa.

Stabilizer construction is conventional, one spar type with a slight lifting section on the ribs. The flat bottom makes it easy to build right on your work board.

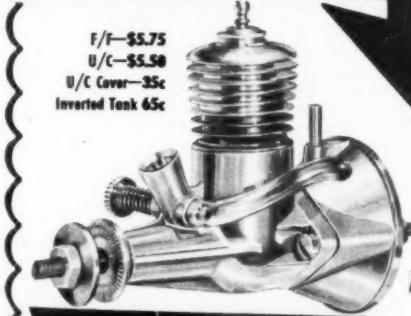
The lower wing is all one piece, with spar, leading edge and trailing edge continuous from tip to tip. The center section is sheeted over with  $1/16$ " sheet where it fits in the cradle cutout on bottom of fuselage. This prevents too many tears in the covering when handling model or in the event of its hitting something in the glide.

Upper wing is also conventional single spar construction, with the exception of the fact that it has the gull section. This is not too hard to handle. Build outer panels, gull sections and center section separately, leaving our rib which is located at the joining points. Cut ends of spar, leading edge, and trailing edge so that they butt joint when the outer panels, gull and center sections are held together at the proper angles, then cement the whole works together, using gussets at joints for strength. If you're not sure of the angles, use some blocks of balsa to hold sections at the right heights on your work table, in a sort of jig, and then cement sections in place. This phase of construction is about the only departure from the usual wing; if you take your time and check each joint before final cementing, it takes only a little longer, and the resulting gull wing makes a very graceful appearance as well as adding to the stability.

Engine is mounted in standard fashion with bolts through firewall. The side mounting makes a very clean cowling arrangement, and permits mounting the tank on a bracket right below fuel intake. We used a K & B *Infant* tank, which bolted easily to the bracket; it holds just enough fuel to give flight of short but ample duration (it would not be wise to let the *Duranita* get up too high). The thrust line is straight ahead—no downthrust or right-thrust—and the resulting flight path has already been described.

Covering and trim is a matter of choice, but we would recommend that you use a butrate dope, like *Sta*, rather than a nitrate

# Flash!



**And Then WINS**

**1st—1/2A JR. PAA EVENT**  
Don Puskerich

**2nd & 3rd—SR. PAA EVENT**  
Verne Pitt—Dick Everett

**3rd, 6th, 7th, 8th, 9th, 10th**  
**in 1/2A FF OPEN EVENT**

**BAKERSFIELD ANNUAL MODEL CONTEST—Bakersfield, Calif.**

**April 12th**

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Plus Other Places

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**SANTA ANA, CALIFORNIA**  
**Naval Air Station**  
(Site of the National Indoor Events)

Yes, modelers, the new Atwood .049 engines really "cleaned up" against all competition. This was the first big event of the season. It was a definite preview of things to come. Here is a partial list of ATWOOD-POWERED winners!

**1st—1/2A OPEN SWEEPSTAKES**  
Toshi Matsuda—Time: 15' 29"

**1st—1/2A JUNIOR EVENT**  
Wally Richards—Time: 16' 21"

**4th—1/2A OPEN**  
W. S. Casselberry

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dope. Diesel fuel won't attack either type, but if you ever wanted to switch engines to a glow plug type, the butyrate dope serves as fuel proofer for both types of fuel.

Since you can't be sure of the weight of balsa, paper, dope, etc., each model varies a little in weight. Ours came in at 14 ounces, everything included. The model should balance just about at the spar of the upper wing and, depending on what wheels, prop spinner, and wood you use, you may have to add some modeling clay either to the tail or nose in order to get right balance.

After balancing model, try some test glides. If there is some tall grass handy, use it to cushion test landings; it isn't absolutely required. Turn prop horizontal to avoid breaking it, and the gear is long enough to handle any but the roughest landings without hitting the prop.

Glide should be straight ahead, with no tendency to nose up and stall. Naturally, if you heave the model too hard, it will nose up, but if you launch it fairly close to gliding speed, it should assume its normal glide angle and glide steadily to the ground. The model is not a floater, but neither should it dive in. In the latter case, add some modeling clay to trailing edge of stabilizer, close to the fuselage. If it noses up and stalls, first check alignment of your surfaces, since this would be rather unusual, if they are properly aligned, then add weight to nose. It is best not to change the angles of the surfaces, as this could affect the power-off characteristics adversely.

After you have achieved desired glide—steady and straight ahead—make a final check to be sure engine is mounted straight; then fuel up and you're ready for the first power flight.

The directions that come with the engine are pretty complete; follow them and you won't run into trouble. Remember, a diesel engine is a lot more flexible than a glow plug engine; it can be made to run steadily at low speeds without the usual sputtering and sputtering. This is a great advantage for testing.

You will find that starting and running a diesel engine is slightly different than the now familiar glow-plug engines. Basic operation of a diesel is compression-ignition. The special fuel ignites when cylinder compression has raised temperature to a certain degree. It needs no outside help as in spark engines. Starting procedures are actually more simple as fuel and compression settings are the only essentials.

To start the *Duro-Glo* diesel, open need valve three and one-half turns. Approximate compression lever setting can be found by gently rocking propeller back and forth so piston passes over top dead center, at the same time slowly increase compression by screwing down lever until piston is felt touching the

adjustable insert. Now decrease compression or unscrew lever three-quarters to one full turn.

Fill tank with McCoy Diesel Fuel and choke engine for three full tuns after fuel line is full. Prime with one or two drops of fuel for easiest starting. While flipping propeller, keep your finger close to hub for greater power and quicker starts.

If engine does not fire after a few turns, gradually increase compression. Repeat priming operation if it still does not fire. If it fires rapidly but only for a few revolutions, it may be too lean or have too little fuel. Repeat choking and priming first and if short, fast runs continue, open needle valve one-half turn at a time until proper fuel flow is obtained. If engine has too much fuel, it will backfire against your finger while flipping. Reduce compression and continue flipping until it starts.

After your engine starts, increase compression until rpm's increase and it is running smoothly. Lean out needle valve and increase compression in stages until maximum speed is reached. The fact that a diesel can be made to run smoothly and steadily at both slow and fast rpm is ideal for testing new airplanes and obtaining performance you want for a specific flight. Due to increase of rpm when model moves forward, it is best to set engine off just a little rich and with compression slightly less than at stationary peak rpm.

**Note:** Allow your diesel a few seconds warm-up before attempting peak settings. If you over-compress the diesel, it will overheat and slow down or quit.

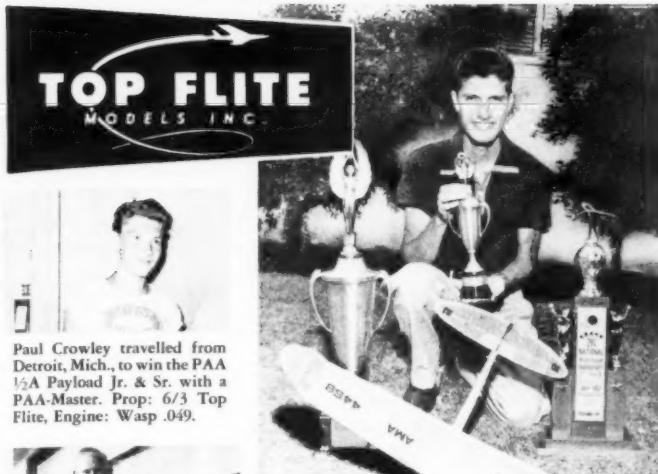
Make first power flight at low power to check characteristic of turn and glide. If you've adjusted it according to directions, the first flight should show a left turn under power, and straight glide, or possibly a right turn in glide. When you have this type of flight, you can give the model all the power of the engine, and it seems to grab the air, hold it firmly, and climb steadily until out of fuel.

After these initial flights, you're pretty much on your own as to what you want to do. We've changed rudder settings to get straight flights with circling glide, and changed thrust line to get straight flight and straight glide (this is a little tricky, but a lot of fun. You have to hit the right power setting for the amount of thrust offset—watch out if you get too much!).

What we'd like to see someone do is make a radio controlled version, using one of the light receivers. With engine turning up, *Durania* could carry about ten ounces of payload, so one of the receiver circuits which, with batteries, hits an all up weight of around eight ounces would give an ample power margin, and model should make a steady sport radio job.

LATER . . .





Paul Crowley travelled from Detroit, Mich., to win the PAA 1/2A Payload Jr. & Sr. with a PAA-Master. Prop: 6/3 Top Flite, Engine: Wasp .049.



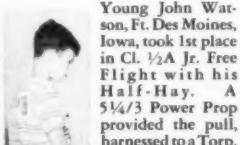
Chickasha, Oklahoma claims credit for Tommy Winton, who took the Control Line Combat Sr. with his All American, using a Fox 35 and a 9/6 Top Flite.



This proud builder is Thomas Dean, Corpus Christi, Texas. Tom's Great Lakes Trainer won the Control Line Flying Scale Open, using a 10/6 Power Prop on a Dooling 29.



12 yr. old Bruce Tune, Los Angeles Cal., looks starry-eyed as he holds his trophy. Bruce won the ROW Jr. with his Smarty, using a 6/3 Top Flite prop on a Torp .049.



Our sincere condolences to the parents of young Lawrence Miles of Medford, Oregon. Lawrence, winner of the Cl. B Junior event, passed away recently after a brief illness. He used a 10/6 Top Flite on his Modified Cumulus.



Nat Antonioli, San Diego, Cal., took top honors in Cl. 1/2A Sr. with his Zeek, using a Wasp .049 with a 5 1/4 Power Prop. That big hunk of hardware on handsome Nat's right is the TOP FLITE perpetual trophy. He is holding the TOP FLITE Miniature, which he keeps permanently.



Bill Lofland, Abilene, Texas, is justly proud of his originally designed job that captured the Cl. C Sr. event. Bill wisely used a 10/6 Top Flite with a Torp 32.



That Stuka, John Lenderman is holding made him a winner in the Control Line Precision Aerobatic Open. Johnny used a 10/6 Top Flite with a Fox 35 engine.



Here's Frankie Adams of Newark, Cal., with his All American Sr. Frankie stuck a 10/6 Power Prop on a Fox 29 to win the Control Line Precision Junior Aerobatic event.



What a team! Mr. & Mrs. Ray Randall, Colma, Cal., shown with their Grumman Sky Rocket. This happy couple took 1st place in the Navy 1/2A Carrier Control Line event. Engines: Wasp .049's; Props: 5 1/4 Power Props.



Fran Uyematsu, Montebello, Cal., has no reason to frown at his Modified Cumulus. With a Torp 19 and a 9/6 Power Prop, this beauty won the PAA Load, Cl. AB Open.

# Are the Wrong props keeping you from Flying Success?

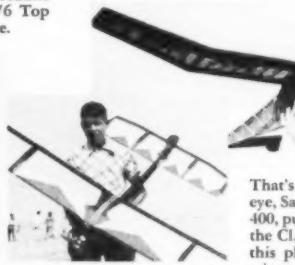
## HERE'S WHAT WINNERS AT THE '52 NATIONALS USED...



The ROW Open went to Elmer Scaggs and his Zeek. Elmer, a member of the U.S.A.F., used a Torp 29 with a 10/6 Top Flite.



Here's Bobby Jones of San Gabriel, Cal. Sorry we can't show you the "Bomb" that Bob used to win the Control Line Combat Jr., but we do know he used a 9/6 Top Flite on a Torp 19 power plant.



A 12/6 Power Prop helped pull Kenneth De Gogies' Sandy Hogan to victory in the Cl. B Sr. That plane looks about as long as Ken, who hails from Sacramento, Cal.



That's pride you see in Jack Smith's eye, Santa Barbara, Cal. His Amazon 400, pulled by a 10/6 Top Flite, won the Cl. B Open. Did you know that this plane was the only Nationals winner designed by a woman? Our congratulations to Sandra Hill.



Wally Short, Redlands, Cal., won the Cl. 1/2A Open with his AWOL (that's where his picture is!), Engine: Wasp .049; Prop: 6/3 Power Prop.



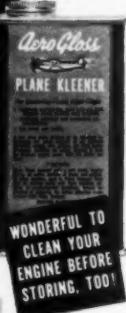
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TYPE—Full Stint

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19 OZ.  
WING LOADING—  
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ENGINE SIZES—14 cu. in.  
TYPE—Full Stint

**KENHI**

KENHI MODEL PRODUCTS, BURBANK, CALIF.

**A Mighty Long Line**

(Continued from page 33)

advisable. A small aluminum trim tab on the rudder helps out in final trim.

Sketch No. 3 is in some ways a better method. It uses the under-rudder and thus eliminates trouble with a pop up tail dethermalizer. The double tow hook is imbedded in the sides of the block, then wrapped with thread and strongly glued. The eyes that hold trigger in place are pushed up through the middle of the block, then bent over and glued.

The position of tow hook along the fuselage is very important. For a fast straight tow it should be placed either directly under C.G. or up to one inch in front of it.

I see no need for contest officials to furnish towlines. It is an added chore and a cause of great confusion at some contests when Joe Never-ready, off in a far corner, is using it for testing. This happens too. I much prefer my own line with its familiar fittings. Inspection of contestants' towlines can be easily made, just as in control line circles. The cost of good nylon line is even less than the cheapest half-A engine. This would eliminate any supposed handicap on the younger group.

The argument that long lines lose more models, is senseless. One of the skills in contest flying is proper use of dethermalizer. A six-minutes flight limit (but no lower) would be far greater help for preventing lost models.

Here then is what we need. A stimulated interest in glider flying, brought about by good flying standards, which are affected by reasonable rules and high goals. Let's use the long line and the better models that will go with it.

**Curtiss Seagull**

(Continued from page 18)

beforehand it will be successful. The ship hits the deck and the hook snags a line, bringing it to a stop.

Want to try it? We did after watching the Carrier event at Los Alamitos National Meet. So we poured over Naval Aircraft back through the years and found the ship which met all our requirements.

It is the Curtiss XSO3C-1 experimental two place Scout-Observation built in 1939. As production model it was known as *Seagull* and equipped with fixed landing gear or floats. This is one of the very few Navy planes to have an in-line engine, a RANGER V-12 air-cooled, developing 520 H.P.; it was inverted. It had a maximum speed of 160 mph and a service ceiling of 23,000 feet. Armament was one 30-cal. forward machine gun projecting through right side of cowl and one 30-cal. flexible rear gun. On anti-submarine patrol a depth charge could be carried under each wing.

We think you'll agree the XSO3C-1 is just about raciest scale Navy ship to be found. And it's practical too, for the whole cabin is quickly removed for access to ignition. The 1" = 1' scale model was designed from a three-view drawing in *Jane's all the World's Aircraft Yearbook* so it is authentic for use in A.M.A. sanctioned meets. Model was built by Walt Farrell. It flies as nicely as it looks.

A Forster .29 ignition motor equipped with two-speed points was chosen to power the XSO3C-1 and we found it dependable and smooth running at high and low speed. Other motors from .29 to .49 may be used. With Forster a high speed of 65 mph was recorded and a low of 38 mph. Ship has a 38" wingspan, wing area 256 sq. in. Weight is 2-1/2 lbs.

Cut out bulkheads B, C, D, E, F, G from 1/8" plywood. Cement hardwood beams inside of main crutch with Weldwood glue. Assemble bulkheads on crutch and cement in place. Cement 1/2" x 2-1/4" x 20-11/16" medium balsa sides on frame. Build remov-

able cabin next. Make seven cabin frames of  $1/8$ " plywood, cement to pair of  $1/4$ " x  $5/16$ " x  $20$ " hard balsa stringers shown at C. Add  $1/8$ " sq. stringer on top from C to E. Two  $1/16$ " x  $1/8$ " stringers fit into sides of all cabin formers. Wet  $1/32$ " x  $3$ " sheet balsa to bend over cabin sides. Set cabin on frame, tack cement all cowl blocks in place. Engine nose block must be gouged out enough to fit over beams. Now use knife to carve off to proper cross-sections; sand with 2/0 and #400. Carve landing gear fairing block to fit fuselage. Remove cowl blocks, gouge out to  $1/8$ " thickness. Set fuselage aside temporarily.

Build wing next. Cut wing ribs from  $1/8$ " medium balsa. An extra  $1/4$ " thick rib is cemented inside both center ribs for strength. Taper main pine spar from  $1/4$ " x  $5/8$ " x  $35$ " piece. Notch spar at center, raise tips  $3/4$ " under both tops. Cement and bolt maple splice to back of spar with 4-40 x 1 machine screw and stopnuts. Nylon  $3$ " bellcrank is attached to splice with 4-40 machine screw and stopnut. Half of the wing is built at a time. Pin down  $1/2$ " sq. balsa leading edge. Now lay  $1/16$ " x  $4$ " pieces of sheet balsa bottoms to butt against leading edge; cement. Trim to outline of trailing edge and lengthwise from center to R7. Cement wing ribs on sheet balsa. Taper sheet trailing edge. Cement pine spar in notches. Be sure to install lead wires on left wing at this time. Plank top of wing with pieces of  $1/16$ " x  $4$ " sheet balsa starting at front by butting against leading edge. Bevel underside of sheet for trailing edge. Planking on top covers ribs R1 and R7. Cement  $9/16$ " x  $2$ " x  $5$ " balsa wingtips in place. Groove bottom of tip for  $1/16$ " I.D. aluminum tube lead guides. Fill with plastic wood. Carve off leading edge and tips. Sand smooth with 2/0 and #400. Imbed one ounce lead weight in right-tip only.

The assembled wing is now cemented to fuselage. Main wing spar fits into notched crutch. Make  $1/4$ " sheet balsa tail as shown. Arresting gear assembly is made in one unit. A piece of  $1/8$ " x  $1-3/4$ " x  $8-1/4$ " plywood serves as mount. It fits between crutch at F and G. Note in plan form that it is Vee shaped aft of G. Bolt  $1/16$ " aluminum alloy 24st hook bracket with three 4-40 machine screws. Attach trigger guide with two 2-56 machine screws. Install 3-32" diameter steel wire hook on bracket with a kick-down  $1/32$ " diameter wire spring as used on mouse traps. Slot mount to give free trigger action. Insert  $1/16$ " wire trigger in guide. Now install complete unit between crutch; add  $1/4$ " sq. balsa gussets under it as shown in G.

Attach tail wheel to G. Cement tail block and tail in place. Cut small hole in bottom of wing beneath bellcrank bolt, insert  $1/16$ " steel wire pushrod. Solder trigger to pushrod so it releases on full down elevator. Cement top and bottom rear cowls permanently. A  $1/4$ " slot in rear bottom cowl is cut to allow free moving hook. Bend up landing gear from  $3/32$  diameter steel wire; lash and solder front and rear struts. Secure front strut to C with 4-40 J-bolts, and rear strut to motor beams with 4-40 machine screws, stopnuts and  $1/64$ " x  $1/4$ " x  $7/8$ " steel or brass straps. Cement fairing block under fuselage. Cement three pieces of  $1/2$ " x  $2$ " x  $4-1/2$ " balsa to make wheel pants. Tack cement outer piece so it can be removed after carving. Make a  $1/4$ " deep recess to countersink wire strut. Cement pant on and fill with plastic wood. Add washer, wheel and washer; cement outer layer of pant. Strut fairing is  $1/2$ " sheet balsa with groove underside to receive wire. Fill this with plastic wood after wire is in place. Cement  $1/8$ " sheet balsa on bottom, carve to streamline section.

Make rudder from  $1/4$ " sheet balsa in a streamline section. Cement fin on top of fuselage. Offset rudder portion to right side  $3/8$ ".

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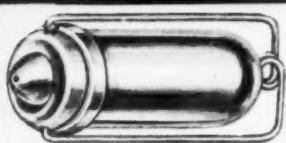
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Install engine with 4-40 machine screws and nut place. Secure two ounce Wedgtank (Perfect #9) to crutch with 1/2" tin strap and wood screws. The coil, battery and relay are all mounted on 1/16" plywood pieces glued to top of crutch. Battery can be moved between E and F to balance ship. Follow Deco two-speed hook-up diagram. You can do most of the ignition assembly outside and install as a unit in ship.

Two 1/8" diameter x 1/2" dowel pegs in rear end of cabin stringers serve as a key for back end of cabin. Aerial mast also serves as spring hold down for front of cabin.

The airplane is now ready for painting. Brush on a coat of Testor clear dope and sand with #400. Cover entire plane with Silkspan tissue paper and clear dope. Spray on thinned Nason's auto lacquer primer-surfacer and sand with #400. When surface is perfectly smooth, spray thinned white Testor Sta dope on plane.

Cement celluloid windows on cabin. Add decal stars, rudder numbers, black painted footprints, aileron and flap black lines, black dowel exhaust stacks, U. S. Navy in one inch black decals on fuselage sides, spinner 1-3/4" diameter, propeller 9" x 6".

Test fly on 50-foot lines, then fly with 60-foot lines when you are sure everything is right. High speed with gas and oil fuel is 65 mph and low speed is 38 mph.

## Which Plug?????

(Continued from page 24)

It should be mentioned, however, that although two examples of each plug were tested and the average figure used in the chart, there seems to be an appreciable variation, in certain cases, between different plugs of the same type and manufacture, so there will undoubtedly be occasions where recommendations of the chart do not work out in practice. One can only observe that when glow plugs first made their appearance, their quality was much more closely controlled than now. Out of 40 different plugs tested, it was rather alarming to find a number with electrical short circuits, or loose center posts. The wear and tear of running seemed to soften the insulating material in others, and electrical resistance of certain makes varied considerably, which indicates that adjacent coils of the filament were touching. This greatly increases the tendency to burn out on battery. It is wise to examine a new plug before use and carefully separate coils with a pin. Methods used to arrive at plug temperatures were simply intended to provide comparisons rather than figures. Since exhaust temperature of an engine will vary according to plug temperature, if all other factors are constant, three engines were accordingly set up with exhausts directed to a thermometer bulb, and tuned to peak performance on average plugs. Room temperature was kept at 60°F, drafts eliminated as far as possible and humidity kept constant. Needle valves of the engines were not touched during tests, and fuel level was maintained between close limits. The three engines were for 3/8" plugs, 1/4" long reach and 1/4" short reach. An Anderson Spitfire, a McCoy .29, and O.K. .049X were used respectively.

One of each type of plug was deliberately burned out to determine its maximum voltage capacity by connecting battery, plug and a rheostat in series with a voltmeter across the plug. This shows which plugs will safely stand the use of a storage battery for starting which, of course, delivers some two volts compared with 1.5 of a dry cell.

Electrical resistance of each plug was measured to see if it followed the pattern of the other two readings. The fact that it did not would indicate that different manufacturers do use different filament alloys. However,

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ME-109 Messerschmitt	\$2.75

P-51 Mustang	\$2.75
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P-38 Lightning	\$3.50
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apart from the fact that it governs amount of current consumed by the plug, resistance is of little interest.

There are a number of other small facts concerning glow plugs which are valuable to the user. Heat range of most plugs can be altered slightly by carefully adjusting position of the filament with a pin. If filament is stretched so that it projects from the recess in the plug body, it will tend to run hotter. If, instead, filament is pushed into the plug body, it will run cooler. This adjustment may fracture filament of an old plug, as with use it becomes brittle.

An old plug will not give quite such good performance as a new one with a clean shiny filament, the reason being that surface of the tiny platinum wire becomes pitted, dull and covered with scale, its heat range changes.

The filament alloy usually consists of platinum which in the form of fine wire will become hot when exposed to alcohol fumes, owing to a chemical action between the two substances. Actually it is a catalytic action because very little change occurs to the platinum. If filament were thin enough, it would produce sufficient heat to ignite alcohol fumes without other assistance. However, in the operation of an engine it is essential that ignition should occur at the right time, so filament is dimensioned so that chemical heat plus compression and engine heat combine to give critical heat value for ignition at just the right moment. It is therefore evident that a thinner filament would tend to heat more easily and give early ignition, and a thicker filament later ignition. Other features of plug design, however, can be made to offset this axiom. An important factor is volume of filament recess in the plug body. If it is large and mixture can circulate easily around the filament, the plug will be relatively "hotter." If it is small or shielded, as in the case of the K. & B. *Everglow* plug, a colder heat range will result. To balance the design, a heavier filament would therefore be used in the former case and a lighter one in the latter.

The new Atwood plug, a hot plug to suit Atwood and other short stroke baby engines, is a good example of free mixture flow type. This plug has a loop filament instead of the usual coil, and a very large recess which reduces engine compression ratio. It balances this reduction by more efficient plug heating, thus improving engine output by reducing internal loss of pumping high compression. This design also has the logical advantage of making the engine less affected by mixture variations, because catalytic action is able to have more effect, and this does not vary much whether the mixture is rich or lean. In the view of the writer, the element recess should either be as small as possible or as large as possible in order, in both cases, to minimize dead space in which burnt gases may be trapped. If recess is small this residue will be small, and if recess is large enough waste gases will be flushed out by fresh charge.

Another important design consideration is filament support. At high rpm, the filament is very fragile owing to its intense heat, and vibration or shock may cause fracture. Other metals are alloyed with platinum to increase physical strength at high temperatures. The common use of iridium is largely responsible for the long life of modern plugs compared with those of four years ago. One apparently excellent means of securing filament support is the use of a bar across mouth of plug with filament fused to center, as featured in all Champion plugs. This bar, incidentally, is not a shield, and the Champion may be classified as a free mixture flow type.

Finally in the K. & B. *Everglow*, and new Atwood plug, we have products of two entirely different schools of thought on plug design. The Atwood is a fresh departure, while the K. & B. has already proved itself; it will be extremely interesting to see which type gives winners a light this season. END



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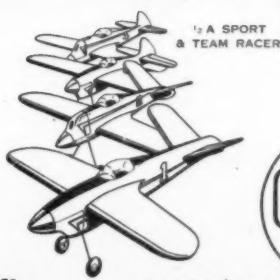
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## Rio Rita by the Lake

(Continued from page 20)

also a model enthusiast, contributes the use of the clubroom to various organizations that use his field facilities.

Meetings get under way with the showing of a sound movie pertaining to model flying in some way, shape or form. Tonight's film is Pan American Airways reel showing the 1951 Grand National Model Meet. The viewers are constantly commenting on construction and flying methods used by their hobby brothers in the film. Ideas are created, flying techniques are carefully noted and the show ends all too soon with a chorus of "Darn, is that all?"

After the showing, Grib calls the meeting to order and the discussion period begins. This meeting is one of great importance to members as they are considering the purchase of a tractor and attachments to be used in caring for their three flying circles. This field is the finest in Kentucky. "Finest in America," say the Junior Members. It is located on a three acre tract of land to the rear of the Rio Rita. Drainage and cutting of grass in flight circles is the problem confronting members. The Club has no debts, but the proposed purchase of the tractor will see them going in the red for \$200.00. Marvin Wander, a ten-year old member of the Board of Directors, raises his hand. Grib acknowledges the boy. "Do you think we can maintain payments?" asks Marvin. Larry Rogers, Club Treasurer, makes a few hasty computations and assures Marvin that, if dues are promptly paid and with the money they hope to make on their Jamboree, they can swing the deal financially. The matter of purchase is further discussed and then voted. The "Ayes" have it. The club has its first large debt and a tractor to do the former hand chores of the members, giving them more flying time.

Tansil Dudley, 36 year old railroad yard foreman for the L&N, takes the floor and displays his newly constructed Betty Skelton Stunt Model. Tansil's wife and two daughters are avid builders and all four are kept busy answering questions. "Tansil just bought me a new television to keep me settled while he's working on his models but on meeting nights I just have to come along, even if I do miss some of my favorite programs," Mrs. Dudley laughingly tells the club. For 23 years Tansil has been a model maker; he now flies 16 ships—with the aid of his wife and daughters.

A regular threesome at the meetings is Dr. Murray Rich, heart specialist and Staff Member at nearby St. Elizabeth Hospital, and his two sons. Each of the boys have a Freshman Trainer and Dr. Rich a new Senior 19. The three spend many happy hours flying—relaxation for the doctor and real comradeship for the boys.

Several prospective new members are then introduced and briefed on the rules and by-laws of the organization. Club Secretary Larry Baarlaer, a well-known Northern Kentucky real estate salesman, explains to newcomers that the Club was organized a little over a year ago by "six fellows who wanted to build

and fly model airplanes." Twenty-four members signed up at the first meeting. The membership has since grown to 55. There are Senior and Junior Members; a Senior is over 20 years of age and must pay \$3.00 a year dues, a Junior is under 20 and pays \$1.50. To encourage father and son teams, a Senior Membership covers all members of one family. The civic purpose of the club is best summed up in the last article of the by-laws—all members must be helpful to the betterment of their community and uphold the ideals of good sportsmanship.

After the indoctrination of the newcomers, plans are made for the gala, once-a-year, open-to-the-public Jamboree Day sponsored by the Club. Committees are formed, Plan of the Day is arranged and new sweaters are distributed. Sweaters stenciled with Club name and insignia are to be uniform of the day for the Jamboree.

As a fitting finale for the meeting, Vice-President Harold Skinner, owner of the Covington Camera Shop, consents to show the movie for the benefit of a few late-comers. Everyone stays to see it again.

In the bull session that follows the meeting the boys talk planes, ideas and Jamboree until Rio Rita closing time. At two-thirty in the morning, the last of the more ardent members are still saying good-bys at the clubhouse parking lot.

Then, it's Jamboree Day—300 thrill-craving spectators line the hillsides. Refreshments are hawked. The day is clear with no wind blowing the flag-pole sleeve. A loud speaker manned by Cliff Kramer is announcing events to come. Junior and Senior Clubmen have their "flying jobs" souped and primed for the occasion. Thirty additional original and kit models are glistening in the sun on the long display benches. Interested spectators inspect them closely. Small boys are warned "not to touch."

The premier act gets underway in Circle One with Teddy Heuser, five and a half year old, youngest member of the club, taking off his Red Trainer. Teddy steadies the controls like a veteran and watches the flight like an alert kitten. After a five-minute run Ted trundles the ship to a perfect landing. "Dad built the Trainer but I painted it," says Teddy admiringly. The tot is in Kindergarten but talks planes like he knows them.

Activity now moves to the back circle as President "Grib" has his DC-3, twin-engine Delta Airliner gassed for flight. "Watch Grib, he really knows how to handle this baby," the loud speaker blares. The plane is a beautiful scale model of one of Delta's Queens of the Heavens. The take-off is perfect, the twin motors roar. The plane handles smoothly and Grib lives up to his advanced billing of "the best flier in the club."

Moving pictures are being taken, both black and white and colored by Harold Skinner. These films will be shown at future meetings and may be borrowed by any interested club in the vicinity. Later viewings of the pictures give members opportunity to study and improve their flying techniques.

In the main circle now appear the Flying Dudleys, a real flying family. They have postponed a Florida vacation to attend the show. Tansil "Father" Dudley has nine models ready for flight. These models are best described by one of the boy spectators as "some beauts." Mrs. Dudley quips, "Plane making and flying with some people is a hobby but with Tansil it is an obsession." But she and her two girls are just as eager to help gas and get the models underway as any boy in the club. The troupe fly for over an hour and at the conclusion of their act get a huge ovation from the viewers.

The Jets prove to be the sensation of the Jamboree. Bill Lanzer exhibits his unfinished Navy Panther jet with Dynajet engine inside (Continued on page 46)

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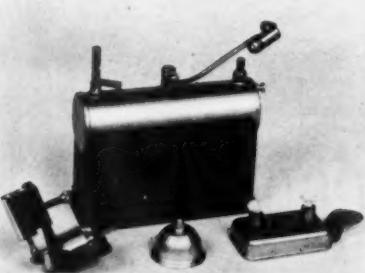
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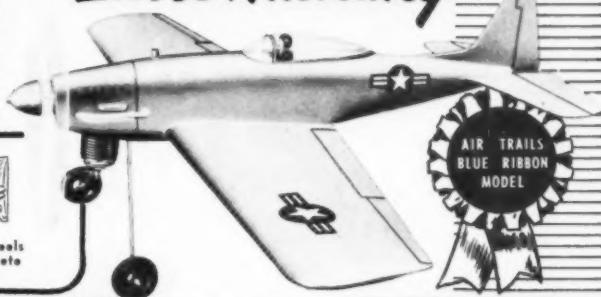
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For 1/2 A" Eng., Electric Motors Authentic Chris-Craft replica with a 12" curved balsa hull and brass metal fittings. All parts finished.



### F-86 SABRE & F-51 MUSTANG -- Both for \$1.50

Our sensational 2-in-1 kit. Contains two complete, realistic profile models. Both control-line flyers take .020 to .074 engines . . . both have 18" wingspans. Not one, but two complete models . . . make and fly both . . . for only \$1.50.



### AERONCA SEDAN \$1.95

SPAN: 22" For .020 to .074 Eng. U-Control, authentic scale model. It's prefabricated . . . with a carved balsa fuselage, formed wing, etc.



### LITTLE BIPE \$1.50

SPAN: 16" For .020 to .074 Eng. Carved balsa fuselage bi-plane . . . prefabricated for easy assembly. It's control-line. A real value!



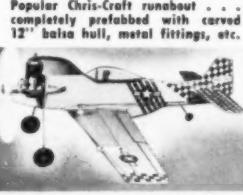
### SPORT RACER \$1.50

SPAN: 18" For .020 to .074 Eng. A good U-Control performer at a remarkably low price. Completely prefabricated kit. Easy to assemble.



### SPECIAL \$3.50

For 1/2 A" Eng., Electric Motors Popular Chris-Craft runabout . . . completely prefabricated with carved 12" balsa hull, metal fittings, etc.



### BOEING F4B-4 \$2.95

SPAN: 17 1/2" For .020 to .074 Eng. Brand new deluxe U-Control model. 100% complete with carved balsa fuselage, wings, etc. A real "honey".



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For 1/2 A" Eng., Electric Motors Here's our sleek cabin cruiser. Has a removable balsa cabin, 14" carved balsa hull - 100% complete.



### BUCKEYE JR. \$3.95

LENGTH: 14" For .020 to .074 Eng. A "beaut" of a speedboat. Prefabricated model is 100% complete - carved balsa hull, brass fittings.



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SPAN: 18" For .020 to .074 Eng. In honor of the F-86 (Sabre Jet). U-Control model. All parts cut and shaped for easy assembly.



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1/2 A" Eng., CO<sub>2</sub>, or Elec. Motors Our exclusive aeronautical fin and rudder design. Prefabricated model has 12" carved balsa hull, etc., etc.



### CO<sub>2</sub> SQUIRT \$1.50

1/2 A" Eng., CO<sub>2</sub>, or Elec. Motors Here's an outstanding performer at a tiny price. Kit comes prefabricated for easy assembly.



### BOEING P-26A \$2.95

SPAN: 18" For .020 to .074 Eng. An excellent control-line flyer. Prefabricated kit is complete in every detail . . . all parts finished.



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LENGTH: 17" For .099 to .29 Eng. Our deluxe speedboat . . . a real thrill. Features precision finished parts . . . super prefabricated.



### SEA HAWK \$2.50

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### CESSNA "170" \$1.95

SPAN: 22" For .020 to .074 Eng. Scale control-line model. Prefabricated kit has formed balsa fuselage and wing, all metal parts, etc., etc.



### PIPER CUB \$1.95

SPAN: 22" For .020 to .074 Eng. A U-Control scale replica of the real plane. Prefabricated model has metal cowl, carved fuselage, etc.



### STINSON VOYAGER 1.95

SPAN: 22" For .020 to .074 Eng. Scale model. Carved balsa fuselage, formed wing, aluminum cowl, etc., in the prefabricated kit. U-Control.



### 1/2-PINT RACER \$2.95

LENGTH: 9" For 1/2 A" Gas. Eng. Speeds over 40 m.p.h. Features direct wheel drive. Prefabricated kit has formed body, rubber wheels.



### LITTLE ACE \$1.95

SPAN: 18" For .049 to .099 Eng. For team racing or sport flying. Kit is 100% complete with formed fuselage & wing, metal cowl, etc.



### BEL AIR \$2.95

SPAN: 18" For .039 to .099 Eng. A control-line flyer that's loaded with flying thrills. Prefabricated model has all parts finished.



### BEECHCRAFT "17" \$2.95

SPAN: 16" For .045 to .099 Eng. U-Control, prefabricated model has carved balsa fuselage, formed balsa wings, metal cowl, etc., etc.



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FOX 35



Fox powered more stunt winners last year than all other makes combined!

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Ask the man who flies one!

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## RADIO CONTROL ITEMS by "CONTROL MASTER"

**TRANSMITTER** Operating on the "Examination Free" frequency the transmitter is completely wired and tested. A type 104 tube is used, wind as a pentode to keep the crystal current at a minimum. Power input is 4.5 Watts with 180 volts on the plate. A full quarter wave antenna is included. The key has a positive snap action that indicates clearly when it is on. With heavy duty batteries installed the life is about the same as shelf life.

The entire unit is housed in a sturdy metal cabinet measuring 12" H. x 7" W. x 6" Deep.

Transmitter Type 27X..List \$29.50  
Batteries Required  
1 1/2V. x Filaments — 180V. - Plate



**RECEIVER** This is a HARD TUBE receiver tuned to 27.255Mc. It uses a type 154 tube with either 60 or 67 1/2 volts on the plate and 1 1/2 volts on the filaments. The plate current drain is about 2.2ma. or 2.7ma. depending upon the plate voltage used. The receiver can be mounted by the four corners or laid flat against the fire wall. Extremely rugged construction. Sizes 2 1/8" x 1 1/8" x 2 1/2" high. Weight 4 oz. Receiver Type 27RH..List \$19.95 [wired & tested]

Batteries Required  
1 1/2V. - Filaments — 60-67 1/2 - Plate

**FIELD STRENGTH METER** This meter is the perfect checker of radio equipment. The field strength meter checks the output of the transmitter. The O-3ma. meter checks the receiver and the O-30ma. checks the transmitter drain. It's small compact size makes for easy carrying to the field. Sizes 4" x 4" x 2".

Field Strength Meter Type FS3 List \$19.95  
Batteries Required

If Dealer Cannot Supply, Send Check Or P. O. Money Order To:

**HOBBY ENTERPRISES**

74 NORTH PARK AVENUE

BAY SHORE, NEW YORK

the fuselage. Bill explains that the job has two pounds of insulation installed. First there is an aluminum tube, then two layers of Reynolds wrap and then a layer of asbestos paper. The plane was to be ready for flight today but Bill wants a little more time to iron out some construction items. The spectators seem content just to look at the sleek model and question Bill as to how it will operate.

A Piper Cab, regulation size, flies overhead while dipping its wings slowly from side to side. The Piper pilot is a club member taking a flying lesson. Within the club membership, there is an airline pilot and five who hold private pilot licenses.

"The Scraps of Balsa," an original model built by Bob Horton, is being tested and flown. Bob likes to fly models of his own creation; this flying wing, soaring low over the field, was built from the balsa scrap heap in his workshop.

In the late evening Robert Vaughn, who with his brother Willie have over \$1,500 invested in plane models, flies a "Polish Fighter" with smoke flares attached to each wing. The flight of the plane is easily traced in the evening light by the heavy orange smoke trails. The smoke settling on the field at twilight makes for a fitting ending to this day with the airmen.

The show never really ends officially—it just gradually disintegrates into darkness. Avid fans have remained until the last plane is "in." The sun just called it a day and with night taking over the midway the tired but happy showmen pack their models and in small groups depart from the flying area, recounting the day's adventures and already laying plans for a bigger and greater extravaganza next year.

## Fun with Pre-Fabs

(Continued from page 31)

on a flat surface and raising the other wingtip 2-1/2" above the surface. With some of these models it is a good idea to increase wing camber slightly by steaming the wood.

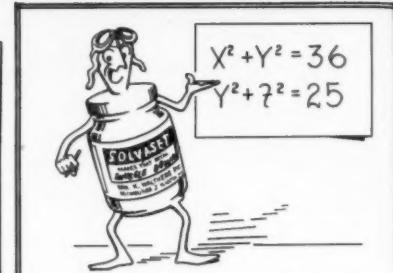
Care in assembling is just as important in these models as in any. Use cement sparingly. A drop at each point where pieces interlock is adequate. A light coating of dope along the seams will seal them. If tail is light enough, you may be able to dispense with some of the landing gear weight and still achieve balance. That part of the wire which is enclosed by the fuselage may be almost entirely eliminated. Hardwood wheels can be sanded thin or drilled for lightness.

The kits supply either a 4" or 5" plastic prop. Use at least a five-incher. However, a real high performance job requires a balsa propeller of at least 6" diameter. The two-strand rubber motor found in the kit is not adequate unless model is extremely light. Three strands of 1/8" flat will do for the average job. It is wise to reinforce fuselage sides where motor dowel passes through to compensate for sanding you have done at that point. Rubber lubricant and a geared winder are musts for ultimate performance.

Light weight is the chief goal in building a contest pre-fab. The Collins model previously mentioned weighed a half ounce. It climbed to the 90-foot ceiling of the Cleveland Public Auditorium. Anything over a full ounce is out of running entirely.

The pre-fabs do offer excellent contest possibilities, as the Cleveland experience has shown. Any group desiring to stimulate interest of beginners in model flying will do well to follow suit. The Cleveland rules require that models be built from pre-fabricated kits, have sheet balsa wing, tail surfaces and fuselage, also, that no parts be omitted, no changes in size or general design be allowed, although propeller and rubber motor may be altered.

END



"A HYPERBOLIC PARABOLA, YOU SAID?"

Let SOLVASET handle the spherical trig - YOU enjoy a well-decaled model.

If you've ever tried to paste a decal on the nose of a 'plane, you know what we're talking about. A flat decal just doesn't conform to a curved surface without some sort of "persuading", and that's where SOLVASET comes in. SOLVASET softens the decal film, enabling it to stretch and conform to irregular surfaces. Won't damage paint or printing.

**SOLVES THE PROBLEM --**  
**-- MAKES DECALS SET**

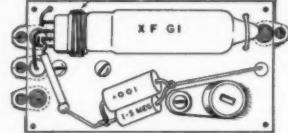
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2 oz bottle  
-- practically a lifetime supply **50¢**

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## "MIDGET 1" RADIO



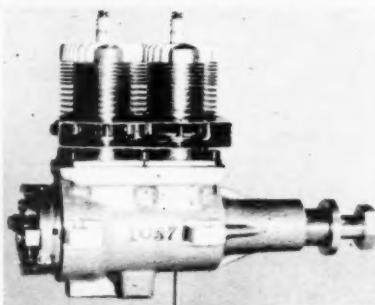
NEW. "MIDGET 1" RECEIVER, TRANSMITTER & ESCAPEMENT. 27 MC LICENSE FREE BAND. SUPER LIGHT WEIGHT RECEIVER USES XFG1 TUBE AND POLARIZED RELAY. CIRCUIT DESIGN IS SIMPLIFIED. RECEIVER IS 1 1/2" HIGH. ESCAPEMENT OPERATES SILENTLY. NO RUBBER OR SPRINGS FOR POWER & SELF NEUTRALIZERS. PARTS FOR ABOVE THREE UNITS SIMPLE EASY ASSEMBLY. TWO YEARS ENGINEERING WORK PUT INTO DESIGNING THE UNITS.

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Lastest Radio Parts catalogue, Tells how to obtain parts at 1/2 to 1/4 price you normally pay..... 25¢

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Displacement .55 cu. in.

## COMING SOON

New more powerful engine  
with carburetor control

New marine engine water cooled  
with carburetor control

All new super power 4-cyl.  
1.10 cu. in. carburetor controlled

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## Compass Steering

(Continued from page 12)

more right leverage than left. Whichever way the job is tackled, it is this setting of the rudder bias that can decide the winner of a steering event, and great emphasis is laid on the importance of making these accurate and minute adjustments. You only have to be half a millimetre out on the trim, and a kilometre away on the other side of the valley, the difference gets enlarged up to a couple of hundred feet! So for more than an hour before the event, out come the fuselages, the boosters, a big pair of binoculars, survey maps to large scale, slide rules, and, a camera mounting tripod.

The tripod is established on a flat spot, and thanks to a screwed ferrule in the bottom of its fuselage, the glider is mounted up just as though it might be something out of the Zeiss workshop. In fact, the way these boys squint down sight lines on the longerons to line up with the distant target, you might well think they've a new kind of telescope on trial. What actually takes place is that the nose is set dead onto the target spot, then the compass base is rotated so that the needle points due north, thus floating free between those contacts. Bias is guessed, set and checked. Shift the fuselage say 7 degrees to the right, and left rudder comes on with a bang. These solenoids certainly pull over smartly, but give dry cells a real tousing. Then straighten up, and rudder comes off. Shift over say 12 degrees to the left and right there on the mountainside and not in the air. A test flight might mean a mighty long scramble down, and a breathtaking climb back, that would take up to a couple of hours! Ski-lifts come in very handy if they happen to be operating in summertime!

So now we are set, we know what we have to do—get the model across to the target—but how do we find the winner? This is where the large scale survey maps are utilized, for everything is decided on them, actual landing spot of each model is pin-pointed, leaving no loophole for argument as to who gets nearest the target.

Herr Professor M. J. Fritschi and Arnold Degen of the Swiss Aero Club officiated at one event seen up at beautiful Arosa and here's the points formula for placing:

$$P = D + 50S$$

D is the distance between launch and landing,

S is the distance between target and landing. So if we land on the button from 1,000 metres we score 1,000 points. If we fall short of target by 50 metres we score only 262 and if we overshoot by 50 metres we score only 312 points; but it is definitely better to overshoot than fall short. A direct spot landing is something of a rarity.

As soon as the job gets the heave-ho, and these are really heavily loaded models weighing several pounds in some cases and needing quite a heave, we can sit back and sweat it out. If you've never had the pleasure of looking on a model for a three-minute flight you have something yet to come. Through army glasses it's a big thrill. Then, suddenly flight is arrested and wings flutter off to slide away from fuselage. You never really know how close to the ground glider gets, until it catches up with its own shadow as the opposite valley slope rises into the glide path. Wings and tail are covered in silk, often with thin plywood leading edge decking, and tongue and box fixture allows them to fall off on a hard landing and slither down the mountain. A whole model might get lodged in an inaccessible place, so almost all of the lengthy structural parts, longerons, spars and trailing edges are of spruce, leaving balsa for ribs only. For a sudden collision with a permanently fixed mountain, you just have to build them tough!

# Take Your Pick the lid's off!

MODEL F-29  
or MODEL F-31

NEW  
LOW PRICE  
ONLY  
\$11.20

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### ALLYN IS FIRST AGAIN!

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- Bell & Socket Swivel built right into model.

- All Structural Parts of Canopy molded in actual color.

- Two Color Base with clear insert panel with plane identification.

The XF-92A Delta Interceptor is the world's first delta wing airplane. Designed for transonic and supersonic speeds in the stratosphere, it is generally recognized as the "shape of the future" for planes faster than sound. Its delta wing configuration has been incorporated into other Convair advanced designs.

**\$2.49**

Number 10 in a line of high quality Allyn plastic model kits, the Delta Interceptor is another must for your collection. Like all Allyn kits it is built true to scale and color and is complete with decals of insignia.

Consistency in quality has made Allyn kits the choice of those who want the best — so be sure and ask for them by name.

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You've had car kits—but these are different! So EASY to build . . . only a few parts for quick assembly . . . the Slickest Kits you've ever seen.

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NASH  
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F-B MODEL AIRCRAFT—2240 LARIMER—DENVER 5, COLO.

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...the Unbelievable



First completely  
assembled airplane  
that really flies!

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2 minute  
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## SIGURD ISAACSON 53009

STATION	0	2.5	5.0	10	20	30	40	50	60	70	80	90	100
UPPER	0	3.4	5.1	7.3	9.0	9.6	9.2	8.5	7.2	5.8	4.1	2.2	0.2
LOWER	0	-0.6	-0.8	-0.6	0.1	0.6	0.7	0.7	0.7	0.6	0.2	0.1	0

P.D.G.

## R.A.F. 30 (60%)

STATION	0	2.5	5.0	10	20	30	40	50	60	70	80	90	100
UPPER	0	1.48	2.07	2.80	3.38	3.79	3.72	3.39	2.86	2.22	1.50	0.78	0
LOWER	0	1.48	2.07	2.80	3.38	3.79	3.72	3.39	2.86	2.22	1.50	0.78	0

As far as design specialties are concerned, the Swiss models, and these are the only Compass Steering jobs we know of, are all large and weighty. Penetration is essential, so wing loads are relatively high and trim arranged for a nose down "look out here I come" sort of a glide path. For C.G. variation, batteries can be shifted fore and aft as these are heavy items, not so very much smaller than a bell-crank. As we said before, that solenoid actuator drains off a lot of power and in fact, it is not unknown for battery to give out completely near the end of a flight. Late type accumulators of the Venner variety would cure that problem without difficulty.

A symmetrical tail section is unusually employed, while wing utilizes one of the popular standard glider sections, MVA, Gottingen, Benedek, NACA 6409 or Isaacson. Isaacson 53009 set at 5 degree incidence with tail at zero would be a good set up, center of gravity being arranged from 33 to 25 per cent forward to get a desirable rate of sink. Swiss fins are almost non-existent! They seem to get away with the smallest of fin area on whatever model they build, and compass jobs are no exception to the rule. We favor something more conventional, particularly as our "Point-to-Point" design is meant to double up for both radio and compass work in Britain. Likewise, the wing load of this point-to-pointer at five ounces per square foot is about half of what would be needed to cross a Swiss valley.

There are few countries, in fact, where this kind of flying can take place exactly as done in Switzerland, and it would be natural enough to assume that world-wide interest in a steering event would be somewhat limited. But at the same time, we cannot help but feel that this ingenious Compass unit could be well employed in other types of models, and doubtless some of our readers will have a few ideas on its possibilities when they read how its Swiss inventors have employed it in the world's most novel contest.

### Engine Review

(Continued from page 34)

To appreciate the difficulties involved, and in order to understand the design features of our test engine, a few facts about diesel operation will help.

Ignition is achieved entirely by heat produced from compressing the mixture. Although low octane fuels are used, compression ratio has to be between 12:1 and 20:1, depending upon load and mixture settings. Ignition is therefore achieved by detonation, the very thing gasoline engine designers avoid at all costs because excessive strains damage the engine. Detonation means "explosion" and the mixture charge in a diesel does, in fact, burn very quickly, which incidentally is the reason why small diesels show up better than large motors.

(Continued on page 49)

### Pen Pals

Keith Ridyard, 71 Kenilworth Rd., Sale, Cheshire, Eng., will swap plans. . . . Richard Gibbs, Grand Promenade, Inglewood, W. Australia, will exchange kits and motors. . . . Al Martner, Jr., 190-20 109 Ave., Hollis 12, N. Y., has engines for trading. . . . D. J. Quick, 8 Claremont Ave., Newtown, Geelong, and Wm. F. Dubber, 69 Henry St., Traralgon, both of Victoria, Australia, want pen pals. . . . Dennis Mar, Laugarbraut 26, Akranes, Iceland, would like a pen pal in San Diego, Calif. . . . Capt. A. L. Burke, 806-14th St., Alexandria, Va., has old MAN's to give away. . . . Alan Coleman, 12 W. Gore Ave., Orlando, Fla., will pay \$10 for an Ohlsson 23.

### THE CONTROL KING

Pat. Pend.

#### MODEL AIRPLANE

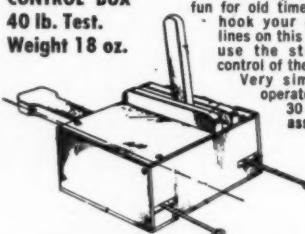
#### CONTROL BOX

40 lb. Test.

Weight 18 oz.

#### AMAZING

Cinch for beginners and fun for old timers. Just hook your control lines on this box and use the stick for control of the model. Very simple to operate. About 30 min. to assemble.



The Control King is an improved means of controlling model airplanes and is an apparatus that is grasped and held in one hand and actuated with the other. It embodies a simple yet efficient system of flying and gives the owner a feeling of flying a real plane.

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#### CONTROL KING

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Further, the low grade fuels used have considerably higher heat value than those for glow engines, thus producing greater expansion pressure when ignited.

The net result of these three factors is far greater working pressure on all loaded parts in the engine, and those parts must be designed to withstand the stress without serious deflection, in order to avoid excessive frictional losses. If these conditions are met, as they are in the McCoy, far more torque is available at the crankshaft than from any other type of engine.

However, since action and reaction are inevitably equal and opposite, a strong power impulse acting on the prop must produce an equal and opposite impulse to twist the engine against its mountings. Therefore, mounts must be very rigid and strong for diesel installations, and should there be any flexibility to dampen each power impulse, a serious loss of performance will occur.

Your first impression when you wind up the new McCoy will be to wonder how it puts out so much steam and stays in one piece. In other words, you have power to spare and can easily afford the trifling weight of a really rugged engine mount. It is worth it.

Having an engine that can really blast the piston down the cylinder bore is only half the battle. The old diesels could do that, and on big props the opinion was that a .29 diesel would do a better job than a .60 gasoline engine. The secret of horsepower is packing as many bangs into one minute as possible. Broadly speaking, high power output comes with high rpm.

Heavy internal loads in a diesel and need for pumping high compression makes the provision of superb bearing surfaces a prime necessity. While there is still a long way to go in this direction, modern manufacturing methods have enabled production of such

bearing finishes at reasonable cost. Allied with this, we now have greatly improved breathing and porting systems with the result that the modern diesel in small sizes can rev up to something approaching the speed of a glow engine and therefore gives more power.

You may wonder where the catch is. All this extra power—there must be a snag somewhere. Well, there are only two trivial objections—actually very minor inconveniences—to the diesel, one being that the best fuels have a sliminess and resistance to rag wiping all their own. A diesel is dirty. The other source of annoyance is that starting on small props requires nimble fingers and a modicum of courage. A diesel, from the very fact that it is powerful, will come round and bite you much more viciously when it fires than a glow engine, especially if it is flooded. Therefore, in the interests of self defense, it is wise to know exactly how much choke and prime to give your particular engine.

In comparison advantages of diesel operation are overwhelming. There are no plugs or batteries to buy. Running life is good. Big props can be used that the equivalent glow motor could not even be started with. Ignition timing can be adjusted to suit any load by regulation of compression control. Also, speed can be controlled to some extent by the same means, and starting is easy under any atmospheric conditions once "diesel feel" has been acquired. Finally, carburation is less critical than on any other type of engine.

Fuels are no problems for all normal uses. Drugstore commercial Ether (Ethyl Oxide) is the ignition agent, ordinary fuel oil from the home oil burner provides power ingredient, and 50 weight auto engine oil will take care of lubrication. Forget oil drag theories. A lighter grade oil will give less performance in a diesel. These three ingredients are most easily mixed in equal parts and make a good fuel. There are many spe-

NOW The Famous

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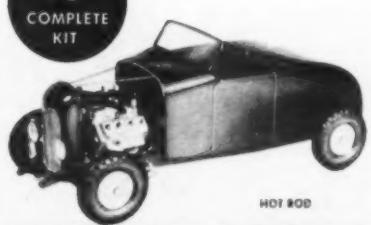
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cial mixes for diesels, but the above is quite satisfactory for non-competitive flying. The manufactured fuel for this engine is recommended for diesel operation in general. The McCoy engine incorporates design features of the best modern diesels with several interesting innovations. It is remarkably easy to start and adjust, and runs smoothly, which assures it of wide popularity.

The basic design will be familiar to most Half-A fans. Crankcase is an aluminum pressure die casting with integral main bearing and front rotary air intake. The slightly raked jet spraybar is pressed through the intake and receives spring friction type needle valve. Heavy radial mounting lugs are provided, and mounting bolts retain the crankcase backplate. The heat treated steel cylinder screws into a slooted thread in the crankcase, slots conveying mixture to three radial bypass ports lying directly beneath three similar exhaust ports. Cylinder seating flange separates bypass from exhaust and forms a gas-tight joint with the crankcase by means of a vellumoid gasket.

Crankshaft is long and rugged with large splines for prop driver seating. Prop retaining thread is No. 8-32, and crankweb and crankpin are much heavier than those for an .049 glow engine. Shaft valve and gas passage are of average size for the displacement, and provide powerful suction without loss of volumetric efficiency owing to use of supplementary induction. At the end of the induction

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stroke lower edge of piston skirt uncovers exhaust ports, thus allowing air to be sucked into upper part of crankcase which becomes mixed with the rest of the charge during its passage through bypass ports. Thus good breathing and reliable carburation are successfully combined.

An extremely strong duralumin conrod is connected to the hardened domed piston by means of a large fully floating wrist pin. This assembly has to take a lot of punishment and McCoy engineers have used the available space to full advantage.

The contra piston which, by raising or lowering, increases or decreases combustion space, is the means of adjusting compression ratio and, therefore, the point at which ignition occurs. As it takes full combustion pressure it must of necessity be a very close fit in top of cylinder. Hitherto, contra pistons have been ground and fitted to close limits, but were still prone to leakage and looseness. The McCoy, however, employs a new feature for obtaining a gas-tight fit and providing correct adjustment pressure. An annular groove is cut in the contra piston, into which is fitted a ring of heatproof flexible composition, which effectively overcomes any tendency to leak or work loose. Furthermore, compression adjustment screw, which projects through the screwed on aluminum cylinder head to bear on the contra piston, is provided with a fiber insert anchored in the head to impart necessary resistance to maintain

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settings. This works on the principle of an aircraft stop nut. Diesels normally run at higher temperatures than glow engines, and the compression screw, accordingly, stands high enough above the head to enable adjustment without suffering burned fingers.

In appearance the McCoy diesel is slightly larger and heavier than an equivalent glow motor in order to stand up to the greater power output; it has a very pleasing appearance with its highly polished crankcase, blued steel fittings, and traditional McCoy red anodized head. Workmanship is up to the well known standard for McCoy engines.

During the test, engine ran well and smoothly with positive control response at all times; starting was easy, hot or cold, and on all prop sizes.

TEST—MC COY DUROGLO .049 DIESEL  
Fuel—48% Ether, 25% Truck Fuel Oil,  
25% S.A.E. Oil, 2% Amyl Nitrate. (McCoy  
fuel was not available at the time of test.  
Manufacturer states that with their fuel Duro  
Glo turns about 2,000 more rpm at high rpm  
than shown by figures below.—Editor)  
Running time prior to test—1 hour; Bore—  
.406"; Stroke—.386"; Weight—1 1/2 ozs.

Power Prop	RPM	Top Flite	RPM
6 x 5	12,000	8 x 4	6,500
6 x 4	13,200	6 x 5	11,600
6 x 3	15,500	6 x 4	13,000
5 1/4 x 5	13,500	6 x 3	14,100
5 1/4 x 4	14,600		
5 1/4 x 3	16,000		

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Motor 1/2A 2000 rpm

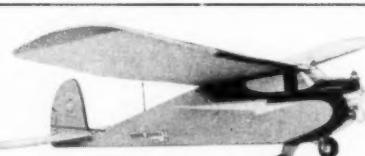
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Power A-5 V.T. engine  
Motor 1/2A 2000 rpm

— THE DE BOLT MODEL ENGINEERING CO. WILLIAMSVILLE, N.Y.—

## Rudolph

(Continued from page 25)

approaches and landings under all weather conditions, and greater descent rates under parcial power.

Now that we have some answers for controlling the top speed, the question arises, "What about the low side of the speed range?" The nose is bound to go down in a turn and, while we have taken care of some of the speed increases with drag what do we do with what's left? The answer is to match wing loading to cruise speed so that the speed range is narrow; our one speed airplane is the result.

This coupling of high drag, power, and wing loading factors result in a smooth flying ship and is much easier to get descents in power approaches for touch and go landings than a clean, lightly loaded ship.

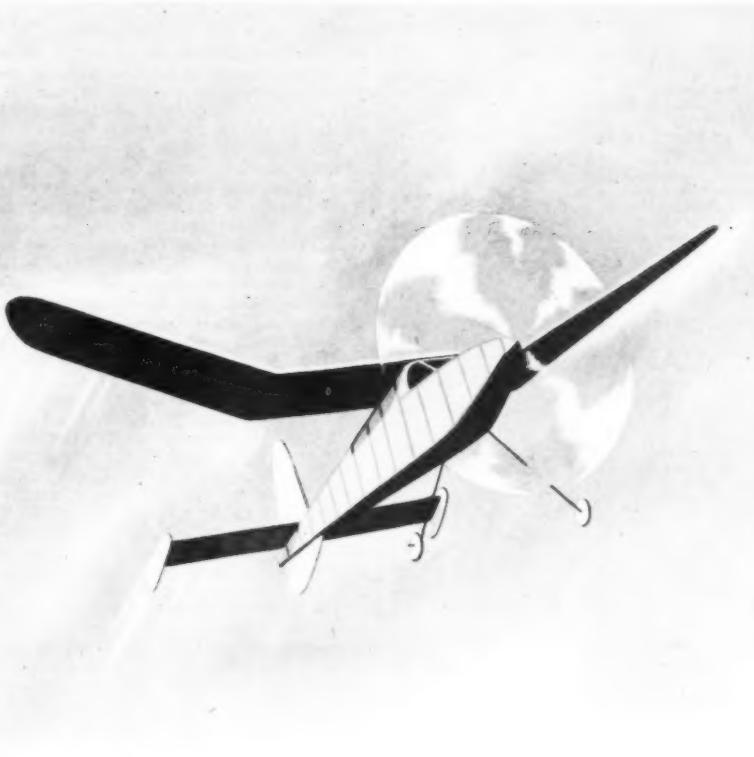
In Rudolph, these factors are balanced in a fairly boxy, "everything in the breeze" five-foot span ship powered by a "hot" .19 with a 16 oz. wing loading. The result is a smooth flying high performance ship that is fast enough for anything but extreme weather.

Other aerodynamics features are the relatively low dihedral angle (which is fast becoming standard practice), high C.G. and low stab position (*Rudderbug* fashion). The effect of the old standard 10 degree dihedral was that while it provided excellent recoveries it also provided violent entries, particularly as the cruising speed increased. Six to seven degrees provide all the lateral stability desired when balanced with proper fin areas and does much to smooth out turn entries. The high C.G. follows the Grant Theory and does much to prevent excessive banking and delay spiraling. I use the term "delay spiraling," as any ship which is trimmed to fly level in straight flight will spiral if turn is tightened by over-controlling! Rudolph is flown by the over-control method where any turn over 90 degrees is made by a series of rudder applications. This overcontrol method of flying gives us an effective proportional control at the expense of turns of the escapement rubber. Finally, stab is in its position for two reasons. First is to get stab out of turbulent wake of wing for maximum stability with minimum stab area. An explanation of this is, while it is impractical to keep stab out of down-wash effect of wing, we can keep it out of the real cause of mischief, the turbulent wake that lies roughly in the area bounded by a line parallel to chord of wing and a line from trailing edge of wing and down at an angle equal to one-half expected maximum angle of attack (possible 12 degrees in an R.C. model) or 6 degrees as a safe angle. The second reason is to provide for adjustable feature of the stab. This feature has proven its worth as it provides a positive index to the longitudinal dihedral angle which is varied to meet prevailing wind conditions and desired type of flight.

Structurally the ship is about as close to a prefab as it is possible to get in a "homebuilt" design. Believing that in simplicity lies strength, every effort has been made to reduce number of parts and provide for fast building and easy maintainance. With the prefab design it is suggested that all parts be cut out first—about a two-hour job if power equipment is available. This leaves you free to assemble the puzzle without annoyance of reaching for razor and ruler before each glue joint. Due to extensive use of sheet structure in the ship a careful choice of wood is of utmost importance in keeping weights in line.

While Rudolph follows manufacturer's instructions for installation of radio and control equipment, there are several points that I would like to emphasize as experience has proven this installation very reliable and trouble free.

First of all, the MacNabb receiver, which has earned an enviable reputation of reliability, functions best with a 67-1/2 volt "B"

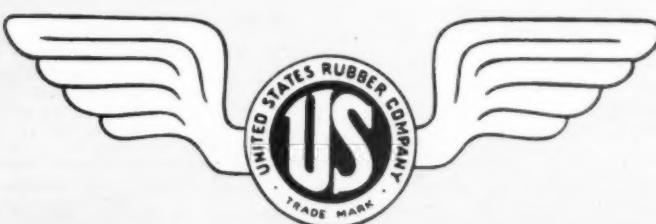


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supply. Three 22-1/2 volt hearing aid batteries make a light, long-lived "B" supply.

Second, good "A" voltage is imperative. Five pencils for "A" supply give a nice 7-1/2 volt start and allow use to a 5-volt minimum or one volt per cell terminal voltage. In actual practice for maximum reliability the "A's" should be changed when a 5-1/2-volt reading under load is obtained.

Escapement battery supply consists of four pencils in series-parallel hookup to obtain three volts. This supply is long lived, and major danger is forgetting that it can run down. A simple check is to try the engine change. Voltage is safe for rudder operation to the point where it will not operate motor escapement with rudder escapement energized.

Hillcrest battery boxes provide a strong and quick change battery installation that is easily installed in the floor under the front hatch, the 5th "A" cell box is a Hillcrest two-cell box split.

Actual receiver mounting is by usual rubber band method. A sponge rubber pillow ahead of receiver forms a secondary safety while primary safety is supplied by a restraining loop of thin-walled vynalite tubing on rear mount. This material and method has been proven through the acid test of crackups that every R. C. goes through sooner or later when we miss some detail of maintenance, use bad piloting technique or just blame interference when we can't explain it.

The action of vynalite tubing is to provide good shock absorbing characteristics while having no rebound effect such as rubber bands provide. It was hit upon after seeing 30-pound test fish line break. I've yet to see vynalite do this. About 1/4" free movement is sufficient for shock absorbing without rebound.

Another point to stress is relay maintenance. Contact pressures are very light, and it is imperative that points be kept clean and bright for receiver reliability. That is, unless you like

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**HALF WILD GOOSE:** Half A free flight. Dec. '51.

**FIRECRACKER:** Flying scale u-control. Dec. '51.

chasing your ship all over the country side; don't forget that you can get some real chasing with straight trim of an R. C. ship.

Escapement installation follows instruction to a tee. The torque rod control is reliable and easy to adjust and maintain. Forward mounting of the escapement allows the most compact wiring and places it where it is easy to keep an eye on it.

Since ship has been designed for two-speed operation, I would like to describe the motor-speed setup. We have found the two-needle valve system the best answer so far. Second needle valve is usually a relatively simple matter to install without any precision machine work. An airbleed is the easiest method of controlling fuel flow through this needle valve. Airbleed valve shown in drawings is easily operated by any two position escapement.

In operation one needle valve is the high speed jet and its fuel line runs directly to the tank. Second needle valve controls low speed by adding extra fuel for a rich two cycle when airbleed is closed. For rapid speed change, airbleed "T" should be as close to intake as possible, while air line can be as long as desired if care is taken that airflow is not restricted.

Methods of adding a shutoff system will suggest themselves; however, I've found a shutoff to be more a hazard than a help.

Fuel and glo-plug combination plays the vital part in low speed operation and may require considerable experimenting to find the best setup for your particular operating conditions. A good starting point from our experience is an O. K. glow plug in combination with Blue Blazer #2 fuel.

Once engine performance is under control, the final factor in determining performance is the prop, particularly since a positive rate of descent is desired under low power. A 9-6 prop will keep *Rudolph* in level flight at the same rpm that a 9-5 prop will show a good rate of descent. Of course low pitch cannot be carried too far, as high power performance will fall off.

Perhaps you will wonder at the emphasis on low speed performance in this article. Well, after you first try it, you will find that touch and go landings, which of course are dependent on low power performance, are one of the most spectacular and skillful maneuvers we can perform with R. C. This one maneuver is well worth the extra work and gadgetry.

Fuselage sides are medium soft light wood. Assembly procedure is to cement side and cabin sheets together, then add uprights and stub longerons. As soon as they dry, slide battery firewall into place and, laying fuselage on its side, add rest of cross members and gussets up to rear of straight cabin section. Check alignment of this section at this point with a square. When dry, clamp rear of fuselage together and put in rest of cross members. Next plank top and bottom with soft sheet and add turtle deck members. Be sure to leave stab section open until control is installed. Next slide plywood battery platform into slots in the two side nose-blocks and cement assembly into position on fuselage. With addition of main engine, firewall and remainder of nose-blocks, fuselage is ready to sand into final shape. Remove upper cowl hatch, form cowl latch hole, add line-up blocks, and fuselage is ready for the gadget assembly, including receiver wiring and final planking. This will complete fuselage up to the finishing with a nylon-covered nose, turtle deck and paper-covered aftersection, which is done when plywood landing gear plate is added.

Main gear is a shock absorbing type originating in England. After about three years of fighting with conventional fixed gear and usual wire straightening and gear mount troubles, this simple system of making gear shock-absorbing was utilized. This, coupled with simple plate mounting, has turned out (Continued on page 54)

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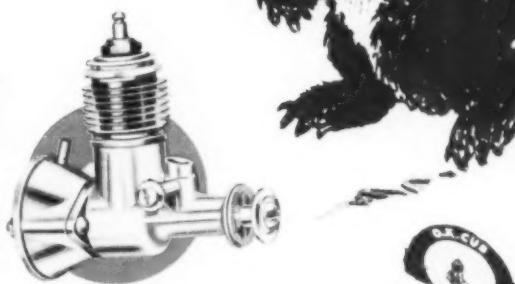


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to be more efficient than was thought at first. The plate acts as an effective gusset between nose and rear sections although butt joint is a lot stronger than you would suspect. Action of gear as it swings through its shock absorbing arc has resulted in about a 50 to 75 per cent saving in broken props and nose-overs, while external rubber band shocks provide easy observation and maintenance.

Tailwheel in the original ship was swivel mounted in the hopes of making it steerable, however, poor field conditions that we generally fly under have not been conducive to experiment, and, therefore, plans show a fixed wheel.

Fin and rudder are shaped in one piece from soft wood, fashioned in the same manner as H. L. glider surfaces. Hinges are nylon in normal control-line manner. This type of hinge has proven its good reliability and wearing qualities. After covering light paper, the fin is cemented to top surface of fuselage with another of these strength deceiving butt joints. Joint should be well filled with several coats of cement.

Stab utilizes the well known "Fireball" construction. Here again care must be exercised in selecting soft, light wood which will result in a lighter than normal stab while giving a strong puncture resistant surface. The 1/16 wire adjustment fitting may give an impression of flimsiness; however, after seeing ship stand up under the inevitable cartwheels that are part of every model's life, you will realize the fitting is amazingly strong through such flexibility. A word of caution: the secret lies in the wire screen gusset that wire is soldered to and in turn cemented in place.

Wing structure is a radical departure from usual practices. Balsa spars just will not hold up under shock loads that a fast heavy R. C. ship will give them. Even sheeted leading edge structures are apt to crack and develop unsuspected weaknesses. In casting about for some method of getting out of the job of cutting holes in ribs for usual rectangular spars, use of dowels was hit upon. It is simple to stack ribs and drill all spar holes at one crack. Again selection of material is important, and straight dowel stock usually requires a bit of

Rib stock should be stringy "C" stock, and even then, will not be strong enough to take shear loads so that shear webs are installed between top and bottom spars as noted in plans. Resulting wing is as light as a balsa sheeted leading edge type and much stronger, with slight amount of flexibility that holds up so much better under shock loads.

Assembly steps are first; assemble spars with a lap dihedral joint bound with narrow strips of nylon. Second, slide ribs on spars and assemble wing, one-half at a time. Third, add shear web, being sure to block wing panels with 4 degree washout in each tip and hold in this shape until thoroughly dry. Fourth, sand structure and cover with nylon.

Finish for entire outside of ship consists of three coats of nitrate dope followed by four coats of Aerogloss or any good butyrate acetate dope with two coats of trim coloring. Interior of nose and battery section is fuelproofed with two thin coats of Weldwood or Casco-Res brushed on.

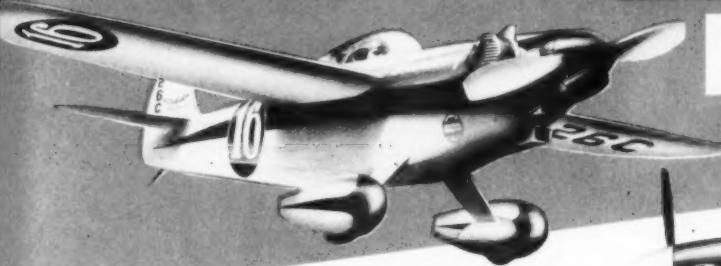
First check complete lineup of ship with particular attention to 4 degree washout in wingtips. Any warps should be removed with generous application of the steam kettle. Yes, the steam kettle. It is the only positive method of obtaining permanent adjustments, and even its application will have to be repeated while dope is thoroughly drying, a process that may take as long as three weeks. Next check position of C. G., a tolerance of 1/4" will keep ship in safe trim for those first few all important test flights. Third and last, make a thorough check of radio and control operation, and you are ready for flying field.

The writer is a firm believer in the fly 'em complete school, even for the beginner. If careful attention has been paid to lineup procedure, free flighting without equipment is a waste of time as you will have to make that first flight with all equipment in some time; before that time you will have been sticking your neck out with an uncontrolled ship. After setting up at the field, ship should be hand glided a couple of times checking carefully for any tendency to turn which must be corrected before first powered flights. Next a thorough equipment check and you are ready for that first flight.



Something of a model herself, guest star Jane Russell stands by as Charles D. Miller—the McCoy man and Treasurer of M.I.A.—presented this model airplane to Charles McCarthy, Bergen shb.

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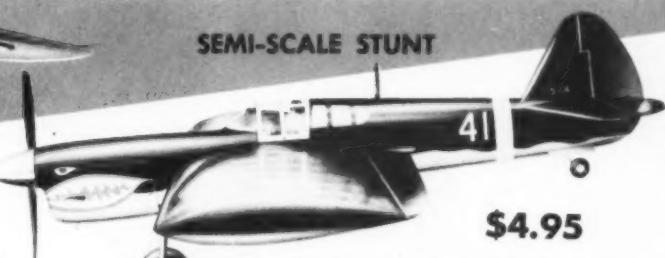
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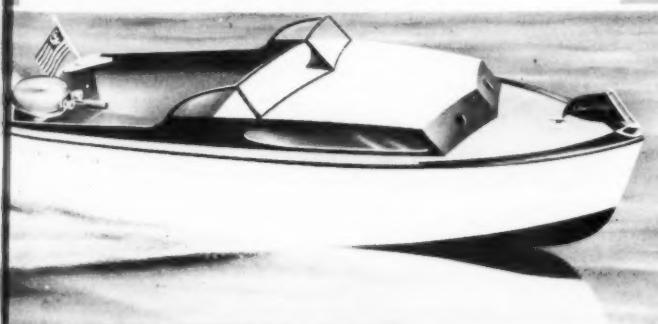
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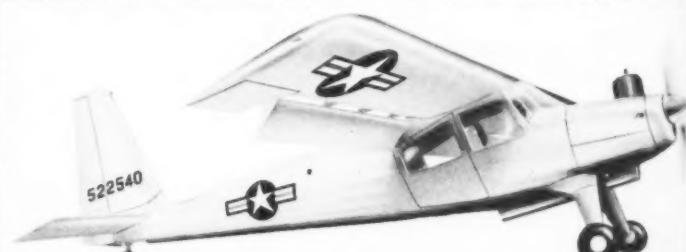
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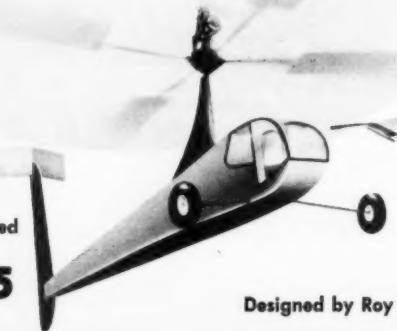
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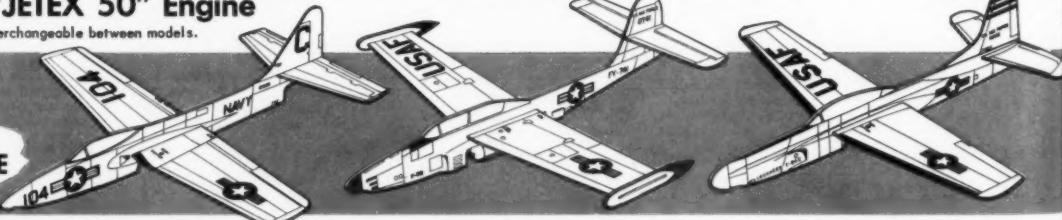
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DETIMENT IN EXHAUST per c UNIT TESTS:	FRANCISCO FUELS	PREPARED			RAW	FUELS
		No. 1	No. 2	No. 3		
Carbon Dioxide . . .	1.9 lb.	2.8	3.1	3.3		
Nitrogen . . . .	6.9 lb.	11.7	10.2	9.4		
Water Condensed . .	1.21	1.5	1.75	2.15		
Residue at 210° F						
Grams/100 ml: . . .	21.63	24.99	23.68	26.58		
Sediment Centrifuge %: trace		.3	.5	8.0		

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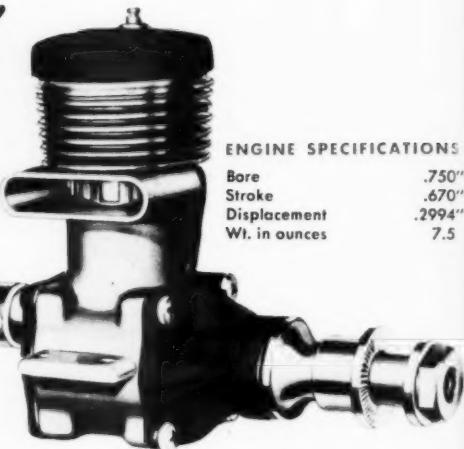
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